UNDERSTANDING SUBJECTIVE QUALITY OF LIFE OF ADULTS WITH HIGH AUTISTIC TRAITS AND AVERAGE COGNITIVE FUNCTIONING: AN EXAMINATION OF INDIVIDUAL AND CONTEXTUAL PREDICTORS

by

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Abstract

Quality of life is a multidimensional construct that encompasses an individual's perception of their position across a variety of life domains including physical health, psychological well-being, social relationships, and personal beliefs and values, all in relation to their current environment and culture (Ayres et al., 2017; WHO, 1997). The present study assessed quality of life of adults with high autistic traits and average cognitive functioning (AST). To address limitations in previous work, life satisfaction, global and domain-specific (i.e., psychological; social; physical; environmental) quality of life were explored in a large sample of adults with AST. In line with a bioecological framework, both individual (i.e., sex; level of autism spectrum traits; co-occurring mental health disorders; self-efficacy; sense of coherence) and contextual (i.e., levels of support, employment status; leisure engagement, leisure satisfaction) factors were assessed in predicting quality of life. In addition to direct relationships, potential indirect relationships between leisure satisfaction and leisure engagement, and quality of life were examined. Data were collected online, internationally, from 131 formally and self-diagnosed adults with AST. Domain-specific quality of life was lower compared to published normative data. Sense of coherence predicted all six domains of quality of life; leisure satisfaction predicted the social and psychological domains of quality of life; biological sex predicted life satisfaction and social quality of life; adaptive skills predicted environmental quality of life; level of ASD traits predicted global quality of life; employment status predicted life satisfaction. Finally, leisure satisfaction was found to significantly mediate the relationship between leisure engagement and higher quality of life. Implications for understanding and improving quality of life among adults with

AST are discussed, including the emergence of two underlying themes: the key role of social functioning and the importance of considering the perspective of the individual.

Dedication

This work is dedicated to all of the neurodiverse individuals I have had the pleasure of getting to know throughout my life. You have been valued friends, colleagues, athletes and clients and have inspired me through your stories, encouragements and supports in various ways.

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Introduction

Overview

Quality of life is a multidimensional construct that encompasses an individual's perception of their position across a variety of life domains including physical health, psychological well-being, social relationships, and personal beliefs and values, all in relation to their current environment and culture (Ayres et al., 2017; WHO, 1997). Quality of life provides a way to evaluate an individual's self-perceived satisfaction with the various facets encompassing their life. A high quality of life reflects an individual's perceptions about feeling safe and secure, experiencing quality relationships, being included by others, their quality of family life, their opportunities for personal development, their physical health, their recreational opportunities, and feeling that their rights have not been violated (Verdugo et al., 2005). There has been variation in the description and measures used to represent overall quality of life in the literature including overlapping definitions of subjective quality of life, well-being, and life satisfaction (Gomez-Lopez et al., 2019; Zissi & Barry, 2006). These definitions have included both affective components (e.g., psychological well-being) and perceptions of objective life circumstances (e.g., life satisfaction) to capture an individual's overall quality of life. The most commonly used definition of quality of life was proposed by the World Health Organization (WHO). The WHO defines quality of life as an individual's perception of "their position in life in the context of the culture and value systems and in relation to their goals, expectations, standards and concerns. It incorporates in a complex way the individual's physical health, life satisfaction, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of the environment" (WHO, 1997, p.1). This definition of quality of life considers an individual's perceptions of their psychological well-being and life satisfaction, as well as their subjective view of objective outcomes. As it is reliant on their own perceptions, individuals can still experience a high quality of life even if their circumstances do not conform to societal standards (Skevington et al., 2004; Skevington et al., 2009).

According to this definition, quality of life involves an individual's subjective experience across four central life domains: psychological, physical, social and environmental. The psychological domain of quality of life includes such facets as negative and positive feelings, body image, self-esteem, and learning. The physical domain of quality of life includes an adults' perception of their ability to complete tasks of daily living as well as their medical health, sleep, mobility and energy levels. The social domain of quality of life includes an adults' perception of their friendships, sexual relationships and social supports. The environmental domain of quality of life includes adults' perceptions of their financial resources, freedom, leisure participation, and physical surroundings. These domains incorporate the important facets of quality of life identified in previous research (e.g., social relationships, well-being, safety and security, satisfaction) and provide a cohesive and comprehensive conceptualization of quality of life needed in the literature (Verdugo et al., 2005; Zissi & Barry, 2006).

Autistic[1] adults differ from the general population on a number of life outcomes that are important to their quality of life. Traditionally, research on autistic adults' quality of life has focused on objective quality of life, which is restricted to the objective components of life based on social norms and standards, independent from personal evaluations (Bishop-Fitzpatrick et al., 2016; Helles, Gillberg, Gillberg & Billstedt, 2017). Objective quality of life includes measures of employment, independent living, social networks, community status and other markers of adulthood (Bishop-Fitzpatrick et al., 2016; Helles, Gillberg, Gillberg & Billstedt, 2017; Thede, 2010). These objective definitions of quality of life primarily reflect an individual's ability to function in their environment relative to societal standards (Costanza et al., 2007; Meeberg, 1993). Objective definitions of quality of life view individuals with physical or mental differences as having a poor quality of life (Helles et al., 2017; Koch et al., 2015). Current conceptualizations of quality of life, following the WHO definition, recognize that quality of life is more than an individual's ability to function in society, as individuals can experience a good quality of life even if their ability to function is impaired (e.g., individuals with a physical disability, mental disorder; Costanza et al., 2007; Vatne & Bjørkly, 2008).

Emerging research investigates the quality of life of adults with Autism Spectrum Disorder (ASD). This group of individuals was traditionally thought to have a poor quality of life, based on objective measures, due to their difficulties functioning typically

[1] Throughout this dissertation, the term 'autistic' is used to describe individuals with Autism Spectrum Disorder (ASD). This choice of language has been made in accordance with the preferences expressed by many within the autistic community. They argue that identity-first language, such as 'autistic person,' acknowledges and respects their neurodiversity as an integral part of their identity.

in society (i.e., living independently; obtaining employment; Helles et al., 2017; Howlin et al., 2004). In contrast to poor outcomes on objective measures of quality of life, research into the subjective quality of life of autistic adults shows that these individuals have a generally good subjective quality of life (Billstedt et al., 2011; Chiang & Wineman, 2014; Gerber et al., 2008). However, when viewed in comparison to the general population, autistic adults still rate their quality of life lower (Jennes-Coussens et al., 2006; Kamio et al., 2012; van Heijst & Geurts, 2015). Specifically, autistic adults rate their quality life in the domains of physical health, psychological health and social relationships lower than the general population and may also perceive themselves as having lower environmental quality of life (Jennes-Coussens et al., 2006; Kamp-Becker et al., 2010; Kamio et al., 2012). Given this discrepancy with the general population, it is important to understand the factors that may relate to these individuals' quality of life and which are linked to favourable outcomes.

Existing research has largely been focused on a few factors that are directly and indirectly associated with the core deficits of ASD (i.e., level of ASD traits; cognitive functioning; adaptive and maladaptive behaviours). Although it is important to understand how ASD traits and associated features are related to quality of life, it is also important to understand the breadth of factors that may be associated with quality of life in order to provide a complete picture of the quality of life of autistic adults. Few studies have examined the associations of non-ASD specific factors with the quality of life of autistic adults and even fewer have examined these non-ASD specific factors using self-report methodology.

Quality of life research of autistic adults has often employed parental or proxy-reporting, which does not directly reflect the experiences of the autistic individual. Current conceptualizations of quality of life reflect the subjective nature of this construct and highlight the importance of understanding an individual's own view of their experiences (WHO, 1997). This suggests that, when studying subjective quality of life, understanding the direct experiences of the individual is best achieved through self-report (Camfield & Skevington, 2008; Costanza et al., 2007). Therefore, the current study examined the subjective quality of life of autistic adults' who are able to self-report on their quality of life. Further, extant research on autistic adults is often conducted using follow-up studies of childhood clinical samples. Due to the broadening definition of ASD, and improvements in diagnostic measures over recent decades, the number of individuals diagnosed later in life is increasing (APA, 2013; Negger, 2014) resulting in a large subset of autistic adults being underrepresented in the current research. Therefore, the study recruited from broader sources and included individuals diagnosed across the lifespan (Helles et al., 2016; Howlin et al., 2004; Howlin, Mawhood & Rutter, 2000; Taylor & Seltzer, 2012). Finally, self-report research tends to be conducted with adults without an intellectual disability (Chiang & Wineman, 2014; Mason et al., 2018). Although the current study did not obtain data on intellectual ability, it was assumed that individuals who are able to navigate to a website and complete an online survey were individuals without an intellectual disability. As verification of diagnoses was not directly conducted in the current study, these individuals are hereafter referred to as adults with high autism spectrum traits and average cognitive functioning (AST).

There are a number of limitations present in the current literature on the subjective quality of life of adults with AST. Extant research is limited in its understanding of the domains of quality of life, in its choice of predictor variables and in its sampling characteristics. First, the examination of specific domains of quality of life of adults with AST has only been examined in a handful of studies (Jennes-Coussens et al., 2006; Kamp-Becker et al., 2010; Kamio et al., 2013; Lin, 2014; van Heijst & Geurts, 2015); therefore, little is known about variation across quality of life domains or how adults with AST compare to the general population. Further, research on the predictors of quality of life reveal that specific predictors may be differentially related to specific domains of quality of life, making an examination of individual domains important for fully understanding the quality of life of adults with AST. Second, research on predictors of quality of life of adults with AST has not been guided by a theoretical model or conceptual framework and has primarily focused on factors that are difficult to modify, and that are associated with lower quality of life (Chiang & Wineman, 2014; Hong et al., 2016; Mason et al., 2018). This lack of framework has resulted in a fragmented understanding of predictors of quality of life, in part, because selected predictors are often examined in isolation and vary across studies (Chiang & Wineman, 2014). Additionally, although this work has identified some specific factors which are linked to reduced quality of life of adults with AST (e.g., ASD symptom severity; maladaptive behavior; Chiang & Wineman, 2014; Kamio et al., 2013), the concept of quality of life is intended to capture an individual's overall subjective well-being and not simply identify factors which can detract from this well-being (WHO, 1997). Therefore, it is essential that research on quality of life address this gap by incorporating an examination of predictors that are expected to be associated with a higher quality of life. Further, research on predictors of quality of life of adults with AST has primarily focused on predictors that are relatively stable and difficult to modify (e.g., ASD symptom severity, cognitive functioning; Chiang & Wineman, 2014; Deserno et al., 2017; Kamio et al., 2013). This approach provides limited guidance for improving the quality of life of adults with AST. Third, extant research is hampered by sampling issues. Many studies include small sample sizes, participants drawn from childhood clinical samples, and few, if any, female participants, all of which limit generalizability to the broader autism community.

The current study aimed to address these limitations by examining the quality of life of adults with AST through an investigation of their global quality of life and life satisfaction as well as specific domains of quality of life (e.g., psychological, physical, social, environmental). In addition, it used a bioecological conceptual framework to guide the choice of specific individual and contextual predictors of the quality of life of adults with AST. The current study included specific predictors that, should they be found to be associated with quality of life, could be potentially modified to promote higher quality of life of adults with AST. In addition, the current study aimed to investigate more complex relationships between specific predictor variables, that is, whether leisure needs fulfilment mediates the relationship between leisure engagement and self-reported quality of life of adults with AST, in order to begin the process of examining the underlying mechanisms in this relationship. Participants were recruited from the broader community and included individuals diagnosed across the lifespan. The next three sections of this chapter will review information on ASD in general, what we know about the quality of life of adults with AST, and literature examining previous predictors of the self-reported quality of life of adults with AST. A discussion of specific limitations of these literatures is presented next, followed by a description of Bronfenbrenner's (1994) bioecological model, and then a section that introduces the predictors for the current study. Finally, research questions and hypotheses which guided the current study are presented.

Autism Spectrum Disorder

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterized by differences in social interaction, social communication as well the presence of restricted repetitive and stereotyped behavior patterns (American Psychiatric Association [APA], 2013). Individuals with ASD vary widely in their abilities, interests, and strengths, and so characteristics of the disorder are expressed differently across individuals (James, Dubey, Smith, Ropar & Tunney, 2016). According to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5), individuals with ASD have a tendency to respond inappropriately in conversation and have difficulty building relationships (APA, 2013). They often engage in a series of unusual routines (e.g., rigid thinking patterns, greeting rituals, need to take the same route or eat the same food every day) and develop peculiar fixations on particular items (e.g., strong attachment to or preoccupation with unusual objects or interests such as trains, toilet brushes, specific time periods etc.; APA, 2013). Individuals with ASD also display a wide range of cognitive ability, ranging from severe intellectual disability to superior cognitive performance (Radzinski, Huerta & Lord, 2013).

The conceptualization of autism originated in 1911 with psychiatrist Paul Eugene Bleuler as a characteristic of schizophrenia (Goldstein & Ozonoff, 2009). Bleuler used the term "autism" to refer to a pattern of idiosyncratic, self-centred thinking that led to a withdrawal into an internal world (Goldstein & Ozonoff, 2009). The syndrome of autism, as a condition distinct from schizophrenia, was originally proposed by Kanner (1943) to describe children who presented as aloof and demonstrated difficulty in speech, social interactions and relationships, and who engaged in repeated play activities and interests. Shortly after, Hans Asperger used the term autism to describe a similar group of children who exhibited poor communication skills, lacked empathy, and were physically, as well as socially, awkward (Goldstein & Ozonoff, 2009). Kanner's descriptions came to be characterized as classical autism and Asperger's descriptions as Asperger Syndrome, both of which are now subsumed under the umbrella of Autism Spectrum Disorder in DSM-5 (Goldstein & Ozonoff, 2009; APA, 2013).

Autism was first included as a defined mental health disorder in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) and the ninth edition of the World Health Organization's International Classification of Diseases (ICD-9-CM) (APA, 1980; World Health Organization [WHO], 1987). In DSM-III, autism and related disorders were given their own grouping, termed Pervasive Developmental Disorders (PDD). Diagnostic criteria were specified and included a lack of interest in people, severe impairments in communication, and atypical responses to the environment; however, only those who developed symptoms before 30 months could be diagnosed. In DSM-III-R the criteria for autism were broadened, including a new diagnosis off PDD-Not Otherwise Specified, to capture the entire spectrum of autism (APA, 1987; Volkmar et al., 1992). DSM-IV and DSM-IV-TR saw a furthering broadening of the definition and the recognition of autism as a spectrum disorder (APA, 1994; 2000). In addition to autism and PDD-NOS, the conditions of Asperger's disorder, childhood disintegrative disorder (CDD) and Rett syndrome were added to the list of PDD diagnoses. With DSM-5, the previously separate diagnoses were subsumed under the newly created Autism Spectrum Disorder (ASD) with the exception of Rett syndrome which was removed from DSM-5 (APA, 2013). Although the classification of the pattern of symptoms characterized by the current conceptualization of Autism Spectrum Disorder have shifted since the previous iterations of the DSM and ICD manuals, the core symptoms of deficits in social communication, and engagement in restricted, repetitive patterns of behavior, have remained consistent (APA, 2013; WHO, 2018).

Currently, to meet criteria for a diagnosis of ASD, the DSM-5 specifies that an individual presents with persistent difficulty in social interaction across multiple contexts including deficits in social-emotional reciprocity, nonverbal communicative behaviours, and in developing, maintaining, and understanding relationships (APA, 2013). In addition, individuals must present with restricted, repetitive behaviours, interests or activities that may include stereotyped motor movement, inflexibility and insistence on sameness, unusual sensory experiences and/or highly restricted, fixed interests (APA, 2013). These features of ASD must have been present in the early developmental period and must cause clinically significant impairment in social, occupational, or other important areas of functioning (APA, 2013). Severity is specified independently for social communication and restricted repetitive behaviours and is based on the level of support required by the individual (APA, 2013). The DSM-5 also includes the specifiers of co-occurring intellectual disability, language impairment or catatonia, and whether the diagnosis is associated with a known medical, genetic or environmental cause, or another neurodevelopmental, mental, or behavioural disorder (APA, 2013).

Individuals with ASD can face a myriad of associated features arising from the disorder (APA, 2013; Mash & Barkley, 2014). There is often a large discrepancy between their level of cognitive functioning and adaptive functioning which is associated with impairments in daily functioning and dissonance in their perceived abilities by others (Renty & Royers, 2007). Individuals may have difficulty with social learning, stemming from decreased social interaction and reduced imitation of behaviour (Chevalier et al., 2012) and difficulties with sleep, eating and other tasks of daily living (Rastam, 2008; Richdale & Schreck, 2009). The associated features of ASD can follow individuals throughout their development and are associated with poorer adult outcomes in terms of objective psychosocial markers (Seltzer et al., 2004).

Individuals with ASD continue to experience impaired functioning into adulthood. The percentage of autistic adults who attain the level of adaptive skills required to live independently is below 20% (Howlin & Magiati, 2017). In adults, deficits in social-emotional reciprocity are associated with challenges processing and responding to complex social cues (Spain & Blainey, 2015). These deficits can be linked to difficulties adapting to novel or unsupported situations and maintaining social relationships (Spain & Blainey, 2015). Autistic adults also suffer from higher rates of anxiety and depression than their neurotypical peers (Gillot & Standen, 2007; Sterling et al., 2008). In addition, autistic adults are more likely than neurotypical peers to be under- or unemployed, despite similar levels of cognitive functioning and academic attainment. These deficits continue to negatively impact individuals throughout their lifespan.

The prevalence of ASD has been estimated at approximately 1 in 59 (Centers for Disease Control and Prevention [CDC], 2018). Rates of ASD are significantly higher in males with a reported overall sex discrepancy ratio of 4:1 male to female in the general population and 9:1 male to female for individuals without an associated intellectual disability (CDC, 2018; Werling & Geschwind, 2013). Due to the broadening definition of ASD and improvements in diagnostic measures over recent decades, the incidence of individuals receiving a diagnosis of ASD is increasing, especially in those with average cognitive functioning (APA, 2013; Negger, 2014). Individuals with ASD and average cognitive functioning are often diagnosed later in life due to their ability to compensate for their autistic traits (Rinehart, Bradshaw, Brereton & Tonge, 2002). Less is known about these individuals because they are often missed in research which recruits from clinics or childhood clinical samples (Helles et al., 2016; Howlin et al., 2004; Howlin, et al., 2000; Taylor & Seltzer, 2012). Many adults with AST are either not diagnosed until adulthood, or remain undiagnosed as adults due to challenges in accessing diagnostic services (APA, 2013; Brugha et al., 2016). It has been estimated that the ratio of diagnosed to undiagnosed cases is 3:2 and that the prevalence of undiagnosed adults with ASD may be as high as 1% of the general population (Baron-Cohen et al., 2009; Brugha et al., 2011). Given the prevalence of undiagnosed adults and the importance of including this understudied population, the current study chose a cautious approach with respect to labelling, choosing to term the current sample as adults with high autistic traits and average cognitive functioning (AST) as opposed to autistic adults. This term was selected in order to most accurately describe the current sample, reflecting the inclusion of both formally diagnosed and self-identified adults. Currently, the experiences of this substantial subgroup of adults displaying high autistic traits who were diagnosed later in development or who remain undiagnosed are underrepresented in the research and therefore less is known about their functioning.

Quality of Life of Adults with AST

Despite the impact of ASD traits across the lifespan, and the poor reported adult outcomes (e.g., under and un-employment, dependent/supported living) the vast majority of research on quality of life of autistic individuals has been focused on child and adolescent populations. In contrast, research examining the quality of life of adults with AST is relatively sparse. Given the lifelong impacts of ASD it is important to understand quality of life across the lifespan for adults with AST. The following literature review will be limited to studies on adults with AST (e.g., adults with ASD and low support needs, Asperger's syndrome), unless otherwise specified.

Emerging research on quality of life follows the World Health Organization's (WHO) definition of quality of life. This definition reflects an individual's perception of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns (WHO, 1997). It implies that quality of life is a person's subjective experience of their own status and performance in life. Quality of life is measured across a variety of life domains including life satisfaction, physical health, psychological well-being, level of independence, social relationships, and personal beliefs and values, all in relation to the individual's current environment and culture (WHO, 1997). This definition is useful because it captures an individual's unique perspective across a broad range of life domains, emphasizing the importance of their own subjective evaluations.

Current conceptualizations of quality of life reflect the subjective nature of this construct and highlight the importance of understanding an individual's own view of their experiences. Self-report has been shown to provide a reliable and valid measurement method in the assessment of adults with AST across a variety of studies and variables (Berthoz & Hill, 2005; Shipman et al., 2011). When self-report and proxy-report have been compared, adults with AST's ratings are generally consistent with parent and clinician ratings across various domains including emotional functioning, personality and objective quality of life (Berthoz & Hill, 2005; Howlin et al., 2004; Schriber et al., 2014). This further indicates that adults with AST have good insight and are able to reliably and validly report on their own experiences. In addition, research has shown that when adults with AST are specifically reporting on the construct of quality of life, these self-reports have demonstrated internal consistency and concurrent and convergent validity (Shipman et al., 2011). These findings suggest that adults with AST are capable of reliably and validly reporting on their own quality of life, and that the information gained from self-report measures provides an important avenue for exploring this construct (Berthoz & Hill, 2005; Shipman, Sheldrick & Perrin, 2011).

Research on the subjective quality of life of adults with AST has shown that they generally report an acceptable to poor overall quality of life (Kamp-Becker, Schroder, Remschmidt, & Bachmann, 2010; Chiang & Wineman, 2014; Hong et al., 2016), which is below the average self-reported quality of life of the general population (Kamio et al, 2013; Kamp-Becker et al., 2010; van Heijst & Geurts, 2015). For example, Kamio and colleagues (2013) examined the self-reported quality of life of adults with high-functioning ASD in Japan and found their sample's ratings were significantly lower when compared to a national population survey. Jennes-Coussens et al. (2006) found that men with Asperger's syndrome in Canada self-reported an overall lower quality of life than did general population adults. In a recent meta-analysis examining quality of life across the lifespan, van Heijst and Geurts (2015) showed that self-reported quality of life was significantly lower for autistic adults compared to the general population. They found a large mean effect size (Cohen's d = -0.96), reinforcing the idea that quality of life is significantly lower in these individuals. In summary, research consistently demonstrates that adults with AST rate their own subjective quality of life significantly lower than do their peers in the general population (Jennes-Coussens et al., 2006; Kamio et al., 2012; van Heijst & Geurts, 2015).

When specific domains of quality of life are examined in adults with AST and compared to the general population, findings demonstrate consistently lower quality of life across the domains of psychological health, physical health, and social functioning (Jennes-Coussens et al., 2006; Kamp-Becker et al., 2010; Kamio et al., 2013; van Heijst & Geurts, 2015). For example, three studies used self-report to investigate the psychological domain of quality of life of adults with AST (Kamp-Becker et al., 2010; Kamio et al., 2012; Lin, 2014) and found that these adults reported significantly lower psychological quality of life in comparison to the general population of adults on the World Health Organization Quality of Life – BREF (WHOQOL-BREF). The psychological domain of quality of life includes such facets as negative and positive feelings, body image, self-esteem, and personal growth. Similarly, four studies have used self-report to investigate the physical domain of quality of life of adults with AST and found that these individuals scored significantly lower in comparison to the general population on the WHOQOL-BREF (Jennes-Coussens et al., 2006; Kamp-Becker et al., 2010; Lin, 2014; van Heijst & Geurts, 2015). The physical domain of quality of life includes an adults' perception of their ability to complete tasks of daily living as well as their medical health, sleep, mobility and energy levels. Four studies have used self-report to investigate the social domain of quality of life of adults with AST and found that adults with AST scored significantly lower in comparison to general population adults on the WHOQOL-BREF (Jennes-Coussens et al., 2006; Kamp-Becker et al., 2010; Kamio et al., 2013; Lin, 2014). The social domain of quality of life includes an adults' perception of their friendships, sexual relationships, and social supports. These findings demonstrate a consistent pattern of reduced quality of life of adults with AST across the psychological, physical and social domains of quality of life.

Research looking at adults with AST's perception of their immediate environment has found mixed results (Jennes-Coussens et al., 2006; Kamp-Becker et al., 2010; Lin, 2014). The environmental domain of quality of life includes adults' perceptions of their financial resources, freedom, leisure participation, and physical surroundings. Two studies found no significant difference between the self-reports of adults with AST and general population adults for the environmental domain of quality of life on the WHOQOL-BREF (Jennes-Coussens et al., 2006; Kamp-Becker et al., 2010), whereas one study found that adults with AST self-reported lower environmental quality of life (Lin, 2014). However, all three studies were limited by small sample sizes (Kamp-Becker et al., 2010; Jennes-Coussens et al., 2006; Lin, 2014).

In summary, research on the quality of life of adults with AST is limited in its scope and understanding of domain differences and how adults with AST compare to the general population, especially for the environmental domain. Extant research is beginning to show differences between the specific domains of quality of life of adults with AST and general population adults; however, the conclusions are drawn from a limited number of studies assessing domains of quality of life (Jennes-Coussens et al., 2006; Kamp-Becker et al., 2010; Lin, 2014). To date, only three studies have examined discrepancies in the self-reported psychological and environmental domains of quality of life and four studies have investigated discrepancies in the social and physical domains of quality of life between adults with AST and the general population (Jennes-Coussens et al., 2006; Kamp-Becker et al., 2010; Kamio et al., 2012; Lin, 2014). Furthermore, studies examining the environmental domain have shown inconsistent findings with no clear pattern emerging (Jennes-Coussens et al., 2006; Kamp-Becker et al., 2010; Lin, 2014). These findings highlight the need for further study of domain differences in adults with AST and the need to understand the factors which may be associated with the quality of life of adults with AST.

Previous Research Predicting Quality of Life of Adults with AST

Although limited, the previous findings highlight that adults with AST may experience a lower quality of life than their peers in the general population for at least the psychological, social and physical domains of quality of life. Therefore, it is critical to identify factors that may be related to higher quality of life in this population. Previous research examining predictors associated with the subjective quality of life of adults with AST has been relatively limited, with a primary focus on characteristic and associated features of ASD. For example, level of ASD traits is one factor that has been considered as a predictor of the quality of life of adults with AST (Chiang & Wineman, 2014;

Derserno et al., 2017; Kamp-Becker et al., 2010, 2011; Saldana, 2009). In their meta-analysis, van Heijst and Geurts (2015) found no relationship between overall level of ASD traits and self-reported or proxy global quality of life of autistic adults with and without intellectual disability. In addition, three studies which specifically examined the relationship between level of ASD traits and self-reported quality of life of adults with AST also found no significant effect (Kamp-Becker et al., 2010; Renty & Royers, 2006). Only two studies have demonstrated a relationship between level of ASD traits and the quality of life of adults with AST (Deserno et al., 2017; Mason et al., 2018). Deserno and colleagues (2017) found that insistence on sameness and reduced social contact, but not overall level of ASD traits, were negatively associated with self-reported psychological quality of life (Deserno et al., 2017). Mason and colleagues (2018) found that a greater level of ASD traits was negatively correlated with quality of life across all four domains of quality of life; however, their study included individuals with and without intellectual disability and utilized a combination of self and proxy-reporting. Overall, this research suggests that level of ASD traits may not predict the quality of life of adults with AST; however, research is limited and further study is required.

Another frequently studied predictor of the subjective quality of life of adults with AST has been their level of cognitive functioning (Billstedt et al., 2011; Deserno et al., 2017; Kamp-Becker et al., 2010; Thede, 2010). In their meta-analysis of predictors of quality of life across the lifespan, van Heijst and Geurts (2015) found that IQ was not a significant predictor of self-reported or proxy quality of life for autistic adults with varying levels of intelligence. Only one study has examined IQ as a predictor of self-reported quality of life specifically in adults with high-functioning ASD (Kamp-Becker et al., 2010). This study failed to find a significant effect of IQ on quality of life (Kamp-Becker and colleagues, 2010). Two studies investigated the extent to which executive functioning (EF; e.g., the ability to plan, focus attention, coordinate thinking, use judgement), a component of cognition, predicted the self-reported quality of life of high-functioning adults with ASD. These studies showed divergent findings with one showing no relationship to quality of life (Thede, 2010) and one demonstrating that EF may be related to lower quality of life (Dijkhuis et al., 2016). Overall, these findings demonstrate that cognitive functioning is likely not a significant factor to consider when investigating the self-reported quality of life of adults with AST.

Adaptive and maladaptive behaviours have both been considered as predictors of self-reported quality of life of adults with AST. Adaptive behaviour includes an individual's' level of independence and their ability to perform tasks of daily living. Kamp-Becker and colleagues (2010) demonstrated a positive association between daily living skills and self-reported quality of life among adults with high-functioning ASD. Maladaptive behaviour includes behavioural problems, such as aggression, which may interfere with an individual's' ability to function successfully. Maladaptive behaviour has been extensively studied in autistic adults with intellectual disability; however, it has received little attention as a predictor of self-reported quality of life of adults with AST (Chiang & Wineman, 2014). Kamio and colleagues (2013) demonstrated that aggressive behaviour predicted reduced self-reported quality of life of adults with high-functioning ASD. These findings suggest that adaptive and maladaptive behaviour may be predictors of self-reported quality of life of adults with AST; however, further research is required.

Several studies have demonstrated a relationship between support characteristics and self-reported quality of life of adults with AST (Kamio et al, 2013; Mason et al., 2018; Renty & Royers, 2006). Support characteristics include social networks, having friends to talk to, community resources, and access to professional support. Kamio and colleagues (2013) found that higher other-rated perceived quality of informal support is related to quality of life of adults with AST. The findings of Renty and Roeyers (2006) show that it is self-perceived, but not received, support that is positively associated with the quality of life of adults with AST (Renty and Royers, 2006). At least one study suggests the relation between support characteristics and quality of life may vary depending on the domains of quality of life. Mason and colleagues (2018) found that received support was positively correlated with quality of life in the social and environmental domains, but not in the physical or psychological domains. However, approximately 20% of their sample completed the measures with the help of a proxy responder due to co-occurring intellectual disability. Given the limited studies and mixed findings, both perceived and received support are important factors to consider as predictors of the quality of life of adults with AST.

Other factors have received cursory attention as predictors of quality of life of adults with AST. Three studies found that the presence of a co-occurring mental health condition predicted lower self-reported quality of life (Helles et al., 2017; Lin, 2014; Lin & Huang, 2019). Two studies, one of which included autistic adults with and without intellectual disability (Mason et al., 2018), found that male participants scored significantly higher on the domains of physical (Kamio et al., 2013) and psychological (Mason et., 2018) quality of life; however, they found opposite results for the social domain. A number of other factors have been investigated in single studies. Self-rated health status, perceived happiness, self-confidence, self-determination, requesting help, and early diagnosis have all been found to predict self-reported quality of life of adults with AST (Carr, 2010; Lin, 2014; Renty & Royers, 2006; Thede, 2010). Finally, one study found that participation in a leisure-based intervention resulted in significant improvements in self-reported quality of life (Hesselmark, Plenty & Bejerot, 2014).

In summary, research on the predictors of subjective quality of life of adults with AST is sparse with only a handful of predictors receiving attention and replication. In addition, the majority of investigated predictors have been characteristics or associated features of ASD and few general individual or contextual predictors of quality of life have been examined in adults with AST. Extant research has also failed to investigate complex relationships between predictors and how they may relate to quality of life. Furthermore, research in the field of ASD is typically conducted with an emphasis on factors that are associated with a poor quality of life and have omitted those associated with higher quality of life (Billstedt et al., 2007; Nordin & Gillberg, 1998). Variables commonly assessed include ASD symptom severity, level of cognitive impairment and maladaptive behaviours (Billsteadt et al., 2011; Chiang & Wineman, 2014). Emerging research has begun to focus on factors that can predict an enhanced subjective quality of life. This emerging framework focuses on identifying factors, such as adaptive skills and support, which are linked to tangible improvements in the life experiences of adults with AST.

Limitations of the Literature on the Quality of Life of Adults with AST

Although factors related to the individual or the context in which adults with AST live are beginning to emerge as potential predictors of quality of life, further research is required to integrate and expand these findings. First, previous research has used various definitions of quality of life interchangeably (e.g., subjective quality of life; well-being; life satisfaction) when examining predictors of quality of life of adults with AST. Although it has been assumed these definitions reflect a similar overarching construct and would therefore be predicted by the same predictors, previous research has not examined this specifically. Second, few studies investigating predictors of the self-reported quality of life of adults with AST have included domain-specific measures of quality of life (Billsteadt et al., 2011; Chiang & Wineman, 2014; Renty & Royers, 2006). Therefore, very little is known about how predictors may be associated with each specific domain of quality of life. Understanding domain differences between the self-reported quality of life of adults with AST and the general population is important as it can provide specific guidance to assist in developing interventions to meet the needs of this population.

Third, research on predictors of quality of life of adults with AST has not been guided by a theoretical model or conceptual framework (Chiang & Wineman, 2014; Mason et al., 2018). This has resulted in a fragmented understanding of predictors of quality of life, in part, because selected predictors are often examined in isolation and vary across studies. Adopting a conceptual framework provides a way to systematically investigate potential predictors of quality of life within the context of the overall framework. In addition, using a conceptual framework enables the study of more complex relationships between predictor variables and how these variables interact to predict the quality of life of adults with AST.

Fourth, research on predictors of quality of life of adults with AST has primarily focused on factors that are associated with lower quality of life (Chiang & Wineman, 2014; Hong et al., 2016; Mason et al., 2018). Although this work has identified specific factors which are associated with a reduced self-reported quality of life of adults with AST (e.g., ASD symptom severity, maladaptive behaviour), the concept of subjective quality of life is intended to capture an individual's overall well-being and not simply identify factors which can detract from this well-being (WHO, 1997). Therefore, it is integral that research on quality of life include predictors that are expected to be associated with a higher quality of life. Fifth, research on predictors of quality of life of adults with AST is relatively limited with only level of ASD traits and cognitive functioning receiving extensive replication (Chiang & Wineman, 2014; Deserno et al., 2017; Kamio et al., 2013). Level of ASD traits and cognitive functioning are relatively stable and difficult to modify; therefore, they offer limited opportunity for developing interventions to augment the quality of life of adults with AST. Various modifiable factors have begun to receive attention (e.g., adaptive behavior; social support; leisure); however, further research is required to replicate and extend these findings. Overall, identifying modifiable variables that are not associated features of ASD, and which may be associated with a higher self-reported quality of life of adults with AST, provides an opportunity to design and implement interventions to enhance the quality of life of this population.

Sixth, extant research on predictors of quality of life has been hampered by sampling issues. In their systematic review, Ayres et al. (2017) found that only two out of the 11 studies examining self-reported quality of life of adults with AST included sample sizes greater than 60, with the majority including less than 30 participants. Similarly, in their systematic review Sáez-Suanes and Álvarez-Couto (2021) found that of the 11 studies examining factors associated with quality of life of adults with AST only two included samples with greater than 80 participants. In addition, several of these studies have used samples recruited as follow-ups from childhood clinical studies or samples recruited from a clinical setting (Deserno et al., 2017; Helles et al., 2017; Hong et al., 2016). Considerably less is known about individuals who were diagnosed later in life and who may be living independently in the community. Furthermore, extant research is limited in its ability to draw conclusions that are applicable across the sexes. Research investigating predictors of self-reported quality life often include samples with few or even no female participants (Helles et al., 2017; Jennes-Coussens et al., 2006; Kamp-Becker et al., 2010; Saldanna et al., 2009). In addition, although existing research in the general population has shown generally similar levels of quality of life between the sexes (Pavot & Diener, 2008; Skevington et al., 2009), only two studies have investigated sex differences in the autistic population (Kamio et al., 2013; Mason et al., 2018). Due to the sampling limitations of previous research, in addition to the small number of studies investigating predictors of quality of life of adults with AST, it is difficult draw firm conclusions.

Based on the aforementioned gaps in the existing research, three goals were selected to address these limitations. The first goal of the current study was to examine the life satisfaction, and global and domain specific self-reported quality of life of adults with AST, and to determine how these measures of quality of life compare to self-reported quality of life of the general population. The second goal of the current study was to use a bioecological conceptual framework to structure the study of predictors of quality of life of adults with AST. Bronfenbrenner's bioecological model was selected because this model, which promotes examination of a variety of individual and contextual factors, is in line with the WHO definition of quality of life (Bronfenbrenner, 1994). The third goal of the current study was to identify specific predictors that are modifiable and are linked to increased quality of life of adults with AST. In addition, a further methodological aim of the current study was to collect a large robust sample of individuals, recruited from the broader community, including a representative sample of both male and female participants.

Using a Bioecological Framework to Evaluate Quality of Life

Bronfenbrenner's bioecological model was selected to provide a theoretical basis for conceptualizing predictors of quality of life. This model provides a way to systematically evaluate the interactions between individuals and the ecological systems in which they exist. The bioecological model includes characteristics of the individual as well as characteristics of four ecological systems (i.e., microsystem, mesosystem, exosystem and macrosystem; Bronfenbrenner & Morris, 2006). The microsystem includes an individual's relationships, interpersonal interactions and immediate surroundings. The mesosystem includes interactions between different parts of an individual's microsystem (e.g., the relationship between their family and romantic partner). The exosystem includes factors which may not affect the individual directly, but that may impact them indirectly (e.g., funding being cut for governmental programs). The macrosystem includes cultural and societal beliefs that may influence an individual's development. The bioecological model is appropriate for understanding individuals of all ages and states that an individual continues to develop across the lifespan (Bronfenbrenner & Morris, 2006).

Bronfenbrenner's bioecological model is aptly suited as a framework for the current study as it if fulfills several needs. First, Bronfenbrenner's bioecological model is consistent with the WHO definition of quality of life in its emphasis on considering the broad influences of an individual and their environment on their quality of life (WHO, 1997; Bronfenbrenner, 1994). Second, this model considers biologically-based characteristics of individuals as important factors in their continued development (Bronfenbrenner & Morris, 2006). ASD traits are strongly influenced by biological characteristics; therefore, this model provided a way to capture the potentially unique experiences of adults with AST. Third, as evidenced in the previous sections, a variety of factors, both individual and contextual, have been shown to affect the quality of life of adults with AST. Bronfenbrenner's bioecological model allowed for consideration of each of these factors in a single comprehensive framework. It also provided direction for the inclusion of novel factors which would be hypothesized to relate to the quality of life of adults with AST. Finally, the model, acknowledging the important contribution of interactions between factors, helped guide the examination of mediation effects included in the current study.

Predictors of Quality of Life of Adults with AST

Following Bronfenbrenner's bioecological framework, six individual predictors and seven contextual predictors were selected for examination within the current study. The selection of these predictors was guided by previous research and will enable a thorough examination of the factors associated with the quality of life of adults with AST.

Individual predictors

Level of ASD traits has been one of the most studied predictors of the quality of life of adults with AST. Higher level of ASD traits has been shown to be negatively associated with objective life outcomes (e.g., employment; independence) of adults with AST (APA, 2013; Billstedt et al., 2007; Magiati et al., 2016). Several studies suggest that level of ASD traits is not significantly related to the self-reported quality of life of adults with AST; however, this research has been limited by reliance on global measures of quality of life. One study, investigating domains of quality of life, suggests that ASD traits may be related to the psychological domain of quality of life (Derserno et al., 2017). Another study, which included a subset of participants with co-occurring intellectual disability, found that level of ASD traits predicted all domains of quality of life in their sample (Mason et al., 2018), whereas a further study found no significant relationship between level of ASD traits and any quality of life domains (Kamp-Becker et al., 2010). Due to these inconsistent results, level of ASD traits was included as a predictor in the current study. It was expected that lower levels of ASD traits would be related to higher self-reported psychological quality of life of adults with AST (Deserno et al., 2017; Mason et al., 2018).

Adults with AST show a high degree of *co-occurrence* with other mental health disorders, with most research finding a co-occurring disorder in over 50% of reporting adults (Gillot & Standen, 2007; Lugnegard, Hallerback & Gillberg, 2011). Existing research has demonstrated the negative association of co-occurring disorders for adults with AST in terms of coping and psychological functioning (Gillot & Standen, 2007; Sterling et al., 2008). Research has demonstrated that having a co-occurring mental health disorder is negatively related to the self-reported quality of life of adults with AST (Hells et al., 2017; Lin, 2014). Given the negative outcomes associated with having a co-occurring mental health disorder and the negative relationship with self-reported quality of life, co-occurrence of a mental health disorder was included as a predictor variable in the current study. Given previous research, it was expected that absence of a co-occurring mental health disorder would be related to higher life satisfaction, and higher global and psychological quality of life of adults with AST.

Self-efficacy is defined as an individual's perception of their ability to successfully accomplish a specific task or goal (Bandura, 1977; Ward & Esposito, 2018). Self-efficacy has shown to predict greater positive affect, lower negative affect, and academic and work satisfaction as well as overall life satisfaction and well-being in the general population (Calandri et al., 2016; Lent et al., 2018; Lent & Brown, 2008). Adults with AST have been shown to have lower perceived self-efficacy than the general population (Lorenz & Heinitz, 2014; Lorenz et al., 2016); however, these studies have been focused specifically on employment self-efficacy and employment outcomes. No studies have examined the self-efficacy for general problem solving of adults with AST and no study has examined the relationship between problem solving self-efficacy and quality of life of adults with AST.

Sense of coherence is defined as the extent to which an individual perceives an enduring feeling of confidence that their life is structured, predictable, manageable and meaningful (Antonovsky, 1987; Olsson, Hansson, Lundblad & Cederblad, 2006). Sense of coherence has been linked to increased adaptive coping strategies, perceived social support, and decreased stress (Olsson et al., 2006) as well as improved mental health, lower depressive symptom severity, and better quality of life of general population adults (Calandri et al., 2016; Paika et al., 2017). In fact, research demonstrates sense of coherence as a factor associated with higher quality of life across a wide range of populations including patients with schizophrenia, coronary heart disease and ischemia, elderly patients with hip fractures, those with mental health conditions, and civil servants (Eriksson & Lindstrom, 2007; Langeland et al., 2007). One study has examined sense of coherence in men with Asperger's syndrome, showing that psychiatric co-occurrence is negatively associated with sense of coherence (Helles et al., 2017); however, no studies have examined the relationship between sense of coherence and self-reported quality of life of adults with AST.

Adults with AST face many challenges in everyday life, above and beyond those of the general population. These challenges may lead to disorganization, feeling overwhelmed and reduced quality of life of adults (Guillot & Standen, 2007). Individuals who feel themselves capable of handling these challenges and who are able to view them in the context of a purposeful life are likely to experience a higher quality of life. Therefore, the current study included the variables *self-efficacy* and *sense of coherence* as potential novel predictors of quality of life. Based on the findings in neurotypical adults as well as the increased challenges faced by adults with AST, it was expected that greater self-efficacy and sense of coherence would be related to higher self-reported quality of life of adults with AST. Specifically, due to the positive associations with mental health and sense of control over one's life and surroundings, it was expected that greater self-efficacy and sense of coherence would be related to higher life satisfaction, and global, psychological and environmental quality of life. Because self-efficacy and sense of coherence are novel predictors which are malleable and were expected to be related to a higher quality of life of adults with AST, they directly address one of the main limitations of previous research and may provide an avenue for targeting interventions to improve the quality of life of this population.

One of the challenges faced by adults with AST includes their ability to complete activities of daily living (APA, 2013; Kamp-Becker et al., 2010). Adaptive behaviour includes an individual's' level of independence and their ability to perform tasks of daily living (e.g., cooking, household chores, tracking finances). Higher adaptive skills predict both higher objective and subjective quality of life of adults with AST (Billsteadt et al., 2011; Chiang & Wineman, 2014; Kamp-Becker et al., 2010). Based on the findings of previous research and on the importance of adaptive skills in meeting the demands of everyday life, adaptive skills was included as a predictor in the current study. It was expected that higher levels of adaptive skills would predict higher self-reported quality of life of adults with AST. Specifically, due to the ability to perform tasks enabling functioning in the environment, it was expected that higher adaptive skills would be related to higher life satisfaction, and global and environmental quality of life. As a modifiable and positive predictor of quality of life, inclusion of adaptive skills in the current study would support the development of interventions designed to improve the quality of life of adults with AST.

Sex and gender are linked to many differences in outcomes for the general population and adults with AST, including physical and mental health, level of education, employment, and criminality (Mason et al., 2018; Teyhan, Wijedasa & Macleod, 2018); therefore, it was expected that there would be differences in the self-reported quality of life between these groups. It is important to note that previous research has largely dichotomized and confounded the variables of sex and gender by asking participants if they are ‘male’ or ‘female’ (Skevington et al., 2004; Mason et al., 2018; Kamio et al., 2013). Depending on the study, this distinction (male or female) has either been referred to as sex or gender (Skevington et al., 2009; Renty & Roeyers, 2006). However, given the three to six times higher rates of gender dysphoria and non-conformity in adults with AST the distinction becomes important as many adults with AST do not conform to this dichotomous definition and indeed identify with various gender identity labels (e.g., agender, gender fluid, gender nonconforming; Lindqvist et al., 2016; Warrier et al., 2020). Since previous research in adults with AST has solely included a dichotomous definition (male versus female), the current study will refer to this variable as sex in order to differentiate it from the broader and subjective variable of gender identity. Research in the general population reveals that males and females generally have similar levels of quality of life (Pavot & Diener, 2008; Skevington et al., 2009). However, some research suggests that males tend to rate higher on affective components of quality of life (i.e., psychological domain) whereas females may rate higher on less affective components of quality of life (i.e., life satisfaction) due to increased levels of internalizing symptoms (e.g., depression) in females (Cherapanov et al., 2010; Bonsaksen, 2012; Graham & Chattopadhyay, 2013). Further, due to sex differences in social functioning, some research suggests that females tend to rate higher on social domains of quality of life (Skevington et al., 2004). It is important to note that only three studies have investigated sex differences in the self-reported quality of life of adults with AST: Kamio and colleagues (2013) and Renty and Roeyers (2006) using self-report, and Mason and colleagues (2018), using a combination of self and proxy reporting. Kamio and colleagues (2013) found that male participants scored significantly higher on the domains of psychological and social quality of life, whereas Mason & colleagues (2018) found that females scored higher on the social domain and males scored higher on the physical domain. Renty and Roeyers (2006) did not find a significant difference on a global measure of quality of life. In order to clarify the findings of previous research, the current study included the variable of *biological sex* (male or female). It was expected that being male would predict a higher quality of life in the psychological and physical domains and being female would predict a higher quality of life on the social domain.

Contextual predictors

Adults with AST often require support to live independently, find employment, and complete tasks of everyday living (Billstedt et al., 2007; Howlin & Magiati, 2017; Magiati et al., 2016). Unsurprisingly, previous research has demonstrated that *level of support* may be positively related to self-reported quality of life of adults with AST (Chiang & Wineman, 2014; Mason et al., 2018; Tobin, Dragger, Richardson, 2014). Self-rated *perceived* support has been positively related to self-reported quality of life for adults with AST; however, research on *received* support has demonstrated inconsistent results (Kamio et al., 2013; Mason et al., 2018; Renty & Royers, 2006). Due to the limited studies and mixed findings, perceived and received formal and informal support were included as predictors in the current study. Given previous research, and the importance of support in attaining adult outcomes (Kamio et al, 2013; Mason et al., 2018), it was expected that higher levels of perceived and received informal and formal support would be related to higher quality of life of adults with AST. Specifically, it was expected that perceived and received informal and formal support would predict higher self-reported life satisfaction and global, physical and environmental quality of life and additionally that higher perceived informal and formal support would predict higher social quality of life (Kamio et al., 2013; Mason et al., 2018). Support services are lacking for adults with AST; moreover, as a potential positive malleable predictor of quality of life, understanding how level of support is linked to quality of life may provide an avenue for improving service availability, thereby bolstering quality of life of this population.

Adults with AST commonly experience challenges with social interaction and communication, and can be rigid in their adherence to routines. Due to these challenges, they often have difficulty obtaining and maintaining employment and are often unemployed or underemployed (Lorenz & Heinitz, 2014; Wehman et al., 2013). Employment is one of the major facets of most individuals' lives, taking up a large portion of waking hours; therefore, it is not surprising that employment status would be related to quality of life (Billsteadt et al., 2011; Garcia-Villamisar et al., 2002). No studies have examined employment status as a predictor of self-reported quality of life of adults with AST. However, two studies including mixed samples of autistic adults with and without co-occurring intellectual disability have examined employment status as a predictor of quality of life by using a combination of self and proxy reporting. Mason and colleagues (2018) found being employed predicted higher quality of life in the physical domain and Carr (2010) found being employed predicted higher global quality of life of autistic adults with and without intellectual disability. Due to the lack of research in self-reported quality of life of adults with AST, employment status was included as a predictor variable in the current study. Given previous findings, and the important role employment plays in daily life (Garcia-Villamisar, Wehman, & Navarro, 2002; Mason et al., 2018), it was expected that being currently employed would be related to higher self-reported life satisfaction and global quality of life of adults with AST. Based on previous research, it was expected that being currently employed would be related to higher quality of life of the physical domain. Due to the ability of employment and income to allow modification of one's environment, it was expected to be related to higher environmental quality of life. Employment is an area in which adults with AST can be supported to help them achieve success; as a modifiable predictor which was expected to be related to higher self-reported quality of life, employment represents an opportunity to increase the quality of life of adults with AST.

Similar to employment, leisure participation takes up a substantial portion of an individual's waking hours; therefore, it is reasonable to assume that both increased engagement in leisure activities and leisure satisfaction should contribute to an individual's quality of life. *Leisure engagement* is defined as the time spent outside of work, school or other obligations, participating in leisure activities (e.g., sports, games, entertainment; Celen-Demirtas, et al., 2014; Kleiber, Mannell, & Walker, 2011; Kuykendall et al., 2015). In addition to traditional leisure engagement, adults with AST often also engage in special interests (Grove et al., 2018; APA, 2013). Special interests are defined as interests that are abnormal in intensity or focus (APA, 2013). A number of studies indicate that the special interests of adults with AST (e.g., cars, computer games, sports) appear to be interchangeable with the concept of leisure as viewed in general population adults (Caldwell-Harris & Jordan, 2012; 2014; Mercier et al., 2000). Therefore, the current study viewed special interests under the umbrella of leisure engagement. In line with this view, Grove and colleagues (2018) investigated the relationship between special interests and quality of life of adults with AST and found that engaging in special interests indeed had an overall positive relationship with quality of life. These findings highlight the positive relationship between leisure engagement and quality in adults with high autistic traits.

Research has shown that leisure engagement can promote an increased quality of life in the general population (Kuykendall et al., 2015; Newman et al., 2014). Only one study has examined this relationship in adults with ASD (Hesselmark et al., 2014) and found that leisure engagement predicted higher self-reported quality of life of adults with ASD. *Leisure satisfaction* is defined as the extent to which an individual's enjoys and is satisfied with their leisure activities (Kuykendall et al., 2015; Newman et al., 2014). Research with general population adults has shown that leisure satisfaction may promote increased subjective quality of life (Newman et al., 2014; Kuykendall et al., 2015). Adults with AST have been found to experience lower satisfaction in this area than the general population (Stacey et al., 2018); however, no study has examined the relationship between leisure satisfaction and self-reported quality of life of adults with AST. Stacey and colleagues (2018) found that leisure satisfaction was negatively correlated with symptoms of anxiety and depression in both adults with AST and those in the general population suggesting a potential link to quality of life. Given previous findings and the important role leisure plays in daily life (Bishop-Fitzpatrick et al., 2017; Grove et al., 2018; Hesselmark et al., 2014) it was expected that higher levels of leisure engagement and higher leisure satisfaction would be related to higher self-reported life satisfaction, and global and domain-specific quality of life of adults with AST. Both leisure engagement and leisure satisfaction were included as separate predictors of quality of life in the current study; however, it was hypothesized that leisure engagement may relate to quality of life through the mechanism of leisure satisfaction (Newman et al., 2014; Kuykendall et al., 2015). Regardless, both variables represent a potential avenue for improving the quality of life of adults with AST due to their malleability and the direction of their expected relationship with quality of life.

Mediation Model

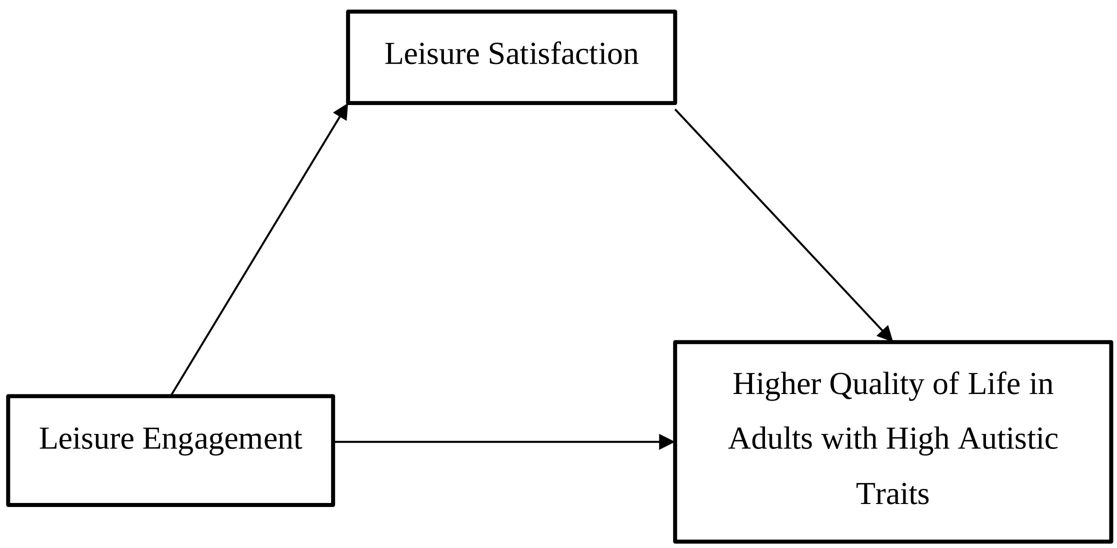
The bioecological model acknowledges complex relationships (e.g., indirect relationships) between factors and how they affect the individual (Bronfenbrenner, 1994). In a mediation relationship of two directly related variables, the mediator functions as the mechanism by which the first variable is linked to the second variable. That is, there is a direct relationship between variable one and variable two and an indirect relationship between variable one and variable two by means of the mediator variable. Variation in variable one leads to variation in the mediator variable which in turn leads to variation in variable two (Hayes. 2013). Although the current study is correlational and did not allow for the examination of the influence of one variable on another, it allowed for the examination of whether the data is consistent with the conceptualization of this indirect relationship.

The current study examined whether leisure satisfaction mediates the relationship between leisure engagement and quality of life of adults with AST (see Figure 1 for a conceptual model). Research in the general population has shown that the relationship between leisure engagement and subjective quality of life is mediated by leisure satisfaction (Kuykendall et al., 2015; Newman et al., 2014). Although no study has investigated the mediating relationship between leisure engagement, leisure satisfaction and quality of life of adults with AST, existing research in this population suggests a mediation relationship may exist (Bishop-Fitzpatrick et al., 2017; Chiang & Wineman, 2014; Garcia-Villamisar & Dattilo, 2010; Grove et al., 2018). Research has demonstrated the direct relationship between leisure engagement and quality of life of adults with AST (Billsteadt, Gillberg & Gillberg, 2011; Bishop-Fitzpatrick et al., 2017; Grove et al., 2018). Additionally, Palmen and colleagues (2011) showed that increased leisure engagement resulted in increased leisure satisfaction in adults with AST (Palmen et al., 2011). Finally, Stacey and colleagues (2018), found that leisure satisfaction was negatively correlated with symptoms of anxiety and depression in adults with AST. Therefore, it was expected that higher levels of leisure engagement would be associated with increases in leisure satisfaction which would then be linked to higher quality of life of adults with AST.

The mediating relationship between leisure engagement, leisure satisfaction and quality of life was prioritized for inclusion in the current study due to the extensive

Figure 1

Leisure Satisfaction as a Mediator of the Relationship Between Leisure Engagement and Quality of Life in Adults with High Autistic Traits



support this relationship has received in the general population as well the emerging research in adults in AST suggesting that a similar relationship is expected in this population. In addition, it also served to highlight the previously described emerging area of research in adults with AST conceptualizing special interests from a strength-based perspective (Caldwell-Harris & Jordan, 2012; 2014; Mercier et al., 2000). If the current study finds a mediating relationship of leisure satisfaction on leisure engagement and quality of life, this would suggest that it is one's satisfaction with leisure, rather than characteristics of the leisure activity itself (e.g., frequency, intensity) that are important to quality of life.

Current Study

It is well-established that adults with AST experience a lower global quality of life relative to the general population (Kamio et al, 2013; Kamp-Becker et al., 2010; van Heijst & Geurts, 2014). Research on the quality of life of adults with AST and factors that predict this construct are beginning to develop; however, significant gaps in the literature remain. Research examining specific domains of quality of life of adults with AST is limited and less in known about the discrepancies observed between adults with AST and the general population of adults or how predictors are associated with these quality of life domains (Jennes-Coussens et al., 2006; Kamio et al., 2012; van Heijst & Geurts, 2015). Furthermore, research on predictors of quality of life of adults with AST has not been guided by a theoretical model or conceptual framework, which has resulted in a fragmented understanding of the predictors of quality of life (Chiang & Wineman, 2014; Mason et al., 2018). In addition, research on predictors of quality of life has primarily identified factors associated with reduced quality of life of adults with AST. However, the concept of quality of life is intended to capture an individual's overall well-being rather than being limited to factors that reduce it (Chiang & Wineman, 2014; Hong et al., 2016; Mason et al., 2018; WHO, 1997). Research on predictors of quality of life of adults with AST is just beginning to investigate predictors which are modifiable and extant research provides limited guidance for improving the quality of life of adults with AST (Chiang & Wineman, 2014; Deserno et al., 2017; Kamio et al., 2012). Finally, previous research is often limited by small or unrepresentative samples, frequently including no, or few, female participants and participants mainly recruited from childhood follow-up and clinical samples.

In order to fill these gaps, the current study examined both the level of life satisfaction and global quality of life as well as the levels of domain-specific (i.e., psychological; physical; social; environmental) quality of life of adults with AST. This allowed for the determination of whether differences exist in domain-specific quality of life between adults with AST and a large sample from the general population (Skevington et al., 2004). In addition, examining specific domains of quality of life allowed for an evaluation of the extent to which individual predictors are associated with each specific domain. These findings are hoped to enable the development of specialized interventions to enhance quality of life, which can be individualized specifically to address the needs of adults with AST. By using a bioecological framework, the current study allowed for the systematic evaluation and integration of predictors of quality of life of adults with AST and provided a framework and guide for future research. The inclusion of a conceptual framework also allowed for the investigation of complex relationships (e.g., between leisure engagement and satisfaction) to understand the mechanisms behind how an individual factor may be associated with quality of life. Several variables were included to address the lack of research on modifiable predictors which have the potential to predict a higher quality of life. Self-efficacy, sense of coherence, adaptive skills, level of supports, employment status, leisure engagement and leisure satisfaction were included as predictors that were hypothesized to be associated with an increased quality of life. The selection of modifiable predictors hypothesized to be related to higher quality of life was chosen to provide an avenue for the development of interventions and supports for improving the quality of life of adults with AST. Finally, to address the sampling limitations of previous research, the current study recruited a large sample size, taken from the broader community of formally and self-diagnosed individuals, with both male and female participants. This enabled the examination of a broad spectrum of predictors and allowed for an evaluation of complex relationships, sex differences and for the generalization of findings to the broader autistic community. To pursue these goals, three research questions and seven hypotheses were formulated.

Research Question 1: What is the quality of life of adults with AST and how does it compare to normative data from a large sample from the general population?

Hypothesis 1: It was expected that adults with AST would rate their domain-specific quality of life lower than the general population for the social, psychological and physical domains. There was not sufficient evidence to make a prediction for the environmental domain.

Research Question 2: To what extent do individual and contextual factors predict higher quality of life of adults with AST?

Hypothesis 2: It was expected that absence of a co-occurring mental health disorder, greater self-efficacy, greater sense of coherence, higher adaptive skills, higher perceived and received levels of formal and informal support, being currently employed, higher leisure engagement and higher leisure satisfaction would be related to higher *life satisfaction* of adults with AST.

Hypothesis 3: It was expected that absence of a co-occurring mental health disorder, greater self-efficacy, greater sense of coherence, higher adaptive skills, higher perceived and received levels of formal and informal support, being currently employed, higher leisure engagement and higher leisure satisfaction would be related to higher *global* quality of life of adults with AST.

Hypothesis 4: It was expected that lower levels of ASD traits, absence of a co-occurring mental health disorder, greater self-efficacy, greater sense of coherence, being biologically male, higher leisure engagement and higher leisure satisfaction would be related to higher *psychological* quality of life of adults with AST.

Hypothesis 5: It was expected that being biologically male, higher perceived and received levels of formal and informal support, being currently employed, higher leisure engagement and higher leisure satisfaction would be related to higher *physical* quality of life of adults with AST.

Hypothesis 6: It was expected that being biologically female, higher perceived levels of formal and informal support, higher leisure engagement and higher leisure satisfaction would be related to higher *social* quality of life of adults with AST.

Hypothesis 7: It was expected that greater self-efficacy, greater sense of coherence, higher adaptive skills, higher perceived and received levels of formal and informal support, being currently employed, higher leisure engagement and higher leisure satisfaction would be related to higher *environmental* quality of life of adults with AST.

Research Question 3: Does leisure satisfaction mediate the relationship between leisure engagement and quality of life of adults with AST?

Hypothesis 8: It was expected that leisure satisfaction would mediate the relationship between leisure engagement and life satisfaction, and global and domain-specific quality of life of adults with AST.

Method

Participants

Participants were 131 adults with AST (*M* = 32.56 years, *SD* = 10.48) who provided self-report information through an online survey. All of the participants scored at or above the clinical threshold of 32 on the Adult Autism Spectrum Quotient (AQ; Baron-Cohen et al., 2001). Participants were diagnosed across the lifespan (*M* = 25.42 years, *SD* = 12.97) by psychologists (50%), psychiatrists (18%), or other professionals (6%). Additionally, 21% of participants identified as self-diagnosed and 5% did not know who had diagnosed them. Participants reported the following educational attainments: 4% no high school diploma; 18% high school diploma; 23% college diploma or certificate; 28% bachelor's or undergraduate degree; 26% graduate degree; and 1% did not respond to the question. They reported living in a mix of rural (24%) and urban (76%) settings. Thirty-four percent lived with a romantic partner, 24% lived alone or with their dependent children, 6% lived with a roommate, and 2% lived in a supported or group home. Participants were mainly from the United States (50%), Canada (21%), and the United Kingdom (9%) with the remainder (20%) residing in other countries. Participants included both biological males (43%) and biological females (57%) who self-identified as male (41%), female (34%), non-binary (16%), or did not specify (9%; e.g., agender, don't know). Forty-five percent of participants were employed including 27% reporting full-time employment. Twenty-four percent were in school part or full-time. Seventy-five percent of participants reported at least one co-occurring mental health condition, while 39% reported at least one physical health condition.

Procedure

Approval to conduct the study was obtained from the Psychology Department Ethics Review Committee and the University of New Brunswick Research Ethics Board. An introductory flyer (see Appendix A) was posted on online forums for autistic individuals, Facebook and Twitter, and provided electronically to agencies, clinics, and support groups that provide services to adults with autism. This flyer directed adults with AST to a website which contained a consent form (see Appendix B). Once an electronic signature was obtained, participants were directed to an online survey. The survey was administered online using CheckBox to increase the geographical range of data collection in an effort to recruit as many participants as possible (Chen et al., 2016). A series of demographic questions was presented first, followed by a screening tool for ASD traits, measures of the participants' quality of life, and then measures of the predictor variables. Once participants submitted their results, each participant was redirected to a separate debriefing page that included information describing the study in more detail and providing informational resources to the individual (see Appendix C). Participants were then provided with the opportunity to enter a draw for a 1/20 chance to win a $50 Visa gift card. Data was collected between December 2019 and March 2020.

An apriori power analysis conducted with G-Power software (Faul, Erdfelder, Buchner & Lang, 2009) indicated that a sample size of 184 would provide adequate power to detect the relationships assessed in the current study; however, data collection was halted prematurely due to the onset of the COVID-19 pandemic. A total of 195 participants completed the survey. Sixty four participants were excluded from the analyses because of the following: completion time was less than 10 minutes (n = 22);

data were missing on the dependent variable (*n* = 11); or the participant did not meet research criteria for ASD (i.e., score on the AQ less than 32; *n* = 31). All surveys were completed in English.

Measures

Demographics. Participants reported on their gender, age, residential status, education level, country of residence, ASD diagnosis, and age at diagnosis (see Appendix D).

Quality of life. The WHOQOL-BREF (WHO, 1998) was developed to provide a quality of life assessment that would be applicable cross-culturally (See Appendix E). The WHOQOL-BREF is a 26 item measure that comprises two global questions and four quality of life domains: Physical (7-items, e.g. 'How well are you able to get around?'), Psychological (6-items, e.g. 'To what extent do you feel your life to be meaningful?'), Social (3-items, e.g. 'How satisfied are you with the support you get from your friends?'), and Environment (8-items, e.g. 'How satisfied are you with your transport'). Items are scored on a five-point scale ranging from one to five. The mean score of items within each domain was used to calculate the domain score. Mean scores were then transformed to a 0-100 scale. A higher score indicates a higher quality of life. Participants completed the measure based on the four weeks prior to administration. Consistent with previous research in adults with AST (Kamio et al., 2013; van Heijst & Geurts, 2015), Cronbach's alpha for the current sample demonstrates an excellent overall internal consistency (α = 0.90) as well as acceptable to good internal consistency for each domain: physical quality of life (α = 0.77), psychological quality of life (α = 0.80), social quality of life (α =

0.73), and for environmental quality of life (α = 0.78). This measure has been used extensively in the literature and has been validated for use with adults with AST (McConachie et al., 2017). The WHOQOL-BREF has demonstrated adequate criterion and construct validity as confirmed by two independent research groups using samples of adults with AST through factor analysis (McConachie et al., 2017; Mason et al., 2018). In addition, the WHOQOL-BREF has been associated with the Hospital Anxiety and Depression Scale (psychological domain, r = 0.76), Craig Hospital Inventory of Environmental Factors—Short Form (environmental domain, r = 0.67), Interpersonal Support Evaluation List-12 (social domain, r = 0.54), and the Comprehensive Quality of Life questionnaire (physical domain, r = 0.68; psychological domain, r = 0.79; social domain, r = 0.59; environmental domain, r = 0.72) and provided evidence for strong convergent, divergent, criterion and discriminant validity in adults with AST (McConachie et al., 2017).

Life satisfaction. The Satisfaction with Life Scale (SWLS; Diener et al., 1985) has been widely used to study life satisfaction, quality of life and subjective well-being (see Appendix L). The SWLS is a five item measure that includes an individual's evaluation of their satisfaction with, and perspectives on, their life (e.g., 'In most ways my life is close to my ideal.'; 'I am satisfied with my life.'; 'If I could live my life over, I would change almost nothing.'). Items are scored on a seven-point Likert scale (1 = "strongly disagree" to 7 = "strongly agree"). The mean from the five items is taken to provide a total score of life satisfaction ranging between 1 – 7. Higher scores denote higher life satisfaction. Cronbach's alpha demonstrates a good overall internal consistency (0.86 – 0.89) in the general population (Steger et al., 2006; Pavot & Diener, 2008), in adults with AST (0.80; Kirchner et al., 2016) and in the current sample (0.89). This measure has been used extensively in the literature and has demonstrated good criterion and construct validity (Hultell & Petter Gustavsson, 2008; Pavot & Diener, 2008). In addition, there is evidence for its having good convergent and discriminant validity as findings show that the SWLS correlates with other scales measuring subjective wellbeing (Hultell & Petter Gustavsson, 2008; Diener et al., 1985). The SWLS has previously been used as a measure of the quality of life of adults with AST (Pisula et al., 2018).

Level of autistic traits. The Adult Autism Spectrum Quotient (AQ-50; Baron-Cohen et al. 2001) was developed for the assessment of autistic traits in adults with average cognitive functioning (see Appendix F). It comprises five subscales measuring key traits thought to be important dimensions of ASD: Social Interaction, Communication, Attention to Detail, Attention Switching and Imagination. The AQ is a 50-item self-report questionnaire with scores on the total scale ranging from 0 to 50. Individual items are rated on a four-point scale and item ratings are converted to a binary score for each item (i.e., zero or one). The higher an individual scores on the AQ-50, the higher number of autistic traits exhibited by the individual. The AQ-50 has a suggested cut-off score of 32, where individuals who score at or above 32 show a substantial level of traits indicative of ASD (Baron-Cohen et al., 2001). For the current study, the total score was used and only participants who scored at or above 32 were included in subsequent analyses. The AQ-50 shows good psychometric properties (Baron-Cohen et al., 2001). The internal reliability of the total scale for the current sample was shown to be acceptable ($\alpha = 0.78$). It has undergone extensive psychometric development and evaluation, with the majority of studies supporting its construct and criterion validity in both individuals with and without a clinical diagnosis of ASD (Wheelwright et al., 2010). It has evidence for strong convergent and divergent validity with the Social Responsiveness Scale (SRS; Armstrong & Iarocci, 2013) and is able to differentiate autistic adults from adults with schizophrenia (Naito, Matsui, Maeda & Tonaka, 2010).

Self-efficacy. The General Self-Efficacy Scale (GSES; Schwarzer & Jerusalem, 1995) was developed to assess an individual's general perception of their self-efficacy with life events (see Appendix G). The scale measures self-efficacy as a single factor containing 10 items (e.g., "I can always manage to solve difficult problems if I try hard enough."). The items are rated from 1 (not at all true) to 4 (exactly true). The GSES provides a total score between 10-40, with higher scores relating to higher perceived self-efficacy. The internal reliability has been shown to be good to excellent with the majority of studies reporting Cronbach's alpha coefficients of 0.85 - 0.90. (Domasio et al., 2016; Schwarzer et al., 1997). Cronbach's alpha for the current sample was shown to be good ($\alpha = 0.87$). This measure has been used extensively in the literature and shown high construct and criterion validity across a variety of populations as well as for use in an online format (Domasio et al., 2016; Schwarzer, Mueller & Greenglass, 1999; Schwarzer & Jerusalem, 2004). It has evidence for strong convergent and divergent validity as evidenced by comparisons to the Beck Depression Scale ($r = -0.49$), Spielberger Trait Anxiety Inventory ($r = -0.34$), Locus of Control Scale ($r = -0.31$), Learned Resourcefulness Scale ($r = 0.58$), and Coopersmith Self Esteem Inventory ($r = 0.49$) (Yildirim & Ilhan, 2010). Although no study has evaluated a general self-efficacy scale for use in adults with AST, one study used items from the GSES with college students with ASD and found it was an adequate measure of self-efficacy in this population (Shattuck et al., 2014).

Sense of coherence. The sense of coherence (SOC) scale (Antonovsky, 1993) was developed to measure the concept of sense of coherence, an adaptive dispositional orientation that enables coping with adverse life experiences (see Appendix H). This scale has been used with adults with AST (Helles et al., 2017). The short form of the SOC scale consists of 13 items that make up three distinct subscales: comprehensibility, manageability and meaningfulness. The items are rated on a seven-point scale ranging from one to seven with five items being reverse scored. The total score can range from 13 to 91 with a higher score indicating a higher sense of coherence. The internal reliability has been shown to be acceptable to excellent, with Cronbach's alpha coefficients of between 0.70 - 0.92 (Eriksson & Lindstrom, 2005). Cronbach's alpha for the current sample was shown to be good (0.82). This measure has been used extensively in the general population and the total score shows evidence as a valid measure of sense of coherence with good criterion and predictive validity, acceptable face validity and moderate consensual validity (Eriksson & Lindstrom, 2005).

Adaptive skills. Adaptive skills were measured using the Waisman – Activities of Daily Living Scale (WADL; Maenner et al., 2013; see Appendix I). The WADL is a 17-item measure of an individual's ability to perform various activities of daily living (e.g., personal grooming; meal preparation; financial management). The items are rated on a three point scale (0 = 'I am unable to do it; 1 = 'I can do it with help'; 2 = 'I can do it without help') which provides a total score ranging from 0 – 34 (Maenner et al., 2013). The WADL is traditionally administered using proxy-reporting; however, it has also been previously modified to be used as a self-report measure in adults with ASD (Hedley et al., 2019). The current study used this modified self-report version employed by Hedley and colleagues (2019). This WADL has good psychometric properties and has found to be a reliable and valid measures of evaluating adaptive behaviour in adults with AST (Maenner et al., 2013; Hedley et al., 2019). The modified WADL has shown good internal reliability, with Cronbach's alpha coefficients of 0.88 - 0.89 for the self-report version (Hedley et al., 2019). Cronbach's alpha for the current sample was shown to be good (0.86). The original proxy-reporting measure has demonstrated evidence for good content, criterion and construct validity as well as convergent validity with the Vineland Screener Composite and the Daily Living Skills Domain (Maenner et al., 2013).

Level of support. Level of support was measured as four separate variables: received formal support; perceived formal support; received informal support; perceived informal support. Received and perceived formal support were obtained based on participants' use of, and perceived access to, the six most important service needs of adults with AST, as indicated by the Canadian Autism Spectrum Disorder Association (CASDA) National Needs Assessment Survey. These were: employment or day programs; social skills programs; life skills training; recreation programs; post-secondary educational programs; mental health treatment (Weiss et al., 2014). Participants were asked to indicate whether they used (no/yes) each of the six service needs over the past month (received formal support) as well as if they perceived they could have accessed those services should they have required them (perceived formal support; see Appendices Q and P). Participants' responses on each of the six services were tallied to form a total score ranging from 0-6 for each of received and perceived formal supports. This measure was developed specifically for the current study.

Received informal support was measured using the question "Over the past month, how much have you received help or assistance from friends, family members or a romantic partner?" (see Appendix R). Participants were asked to provide a response on a 7-point scale (1 = No support; 7 = Daily support) for each of Friends, Family and Romantic Partner. Responses were tallied to form a total score ranging from 1-21. This measure was developed specifically for the current study. Perceived informal support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet & Farley, 1988; see Appendix J). The MSPSS is a 12-item self-report measure of perceived social support from family, friends, and significant other. Items are rated on a 7-point Likert scale (1 = very strongly disagree, 7 = very strongly agree). For the purposes of the present study, the total score was used which ranges from 12 - 84. The internal consistency has been shown to be good to excellent, with Cronbach's alpha coefficients of 0.85 - 0.97. Cronbach's alpha for the current sample was shown to be excellent ($\alpha = 0.90$). The MSPSS has been used extensively in the literature across a variety of populations including adults with AST (Alvarez-Fernandez et al., 2017; Lei, Ashwin, Brosnan & Russell, 2019). The MSPSS has been shown to have good construct and criterion validity as well as convergent validity with the Social Network and Perceived Social Support (SNaPSS) in adults with AST (Osman et al., 2013; Lei et al., 2019).

Co-occurring mental health conditions. Co-occurrence of mental health conditions was assessed using one binary response (i.e., 'Yes/No') question (e.g., 'Do you currently have any other diagnosed mental health conditions?'; see Appendix N). In addition, participants were asked to "please specify" their co-occurring conditions in an open-ended format. This item was developed specifically for this study.

Biological sex. Biological sex was assessed using one question (i.e., "What sex were you assigned at birth?") with two response options: male; female (see Appendix M). This item was developed specifically for this study.

Employment status. Employment status was assessed using one question (i.e., "Are you currently employed?") with three response options: currently employed full-time in regular or supported work (30 or more hours per week); currently employed part-time in regular or supported work (under 30 hours per week); currently unemployed; see Appendix O). For the purposes of the current study, responses were dichotomized as either employed (full-time or part-time; regular and supported employment) or unemployed. This item was developed specifically for this study.

Leisure engagement. Leisure engagement was measured using the leisure categories outlined by Palmen and colleagues (2011; see Appendix S) using a frequency metric developed specifically for the current study. Participants were asked about the frequency of their engagement on a 4-point scale ranging from 0-3 (Never; Sometimes; Often; Everyday) in the following six leisure categories over the previous week: solitary activities and hobbies (i.e., non-electronic activities performed by oneself for the purpose of leisure; e.g., reading a book); social activities (i.e., activities done for the purpose of interacting with others; e.g., hanging out with friends); in-home electronic activities (i.e., activities using electronic devices for purposes of leisure and/or relaxation; e.g., playing video games); outdoor activities (i.e., activities done for the purpose of experience nature;

e.g., walking in the woods); gross-motor activities (i.e., activities done for the purpose of physical exercise and/or coordination; e.g., going to the gym; playing sports); visiting clubs (i.e., activities done for the purpose of pursuing and sharing a specific interest; e.g., card game clubs; autism groups). If a leisure activity fit into multiple categories, participants were asked to select the category which best represents their purpose for engaging in the activity. Leisure engagement was quantified as a total score reflecting the frequency of participation across the six leisure categories ranging from 0-18.

Leisure satisfaction. Leisure satisfaction was measured using the Leisure Satisfaction Scale (LSS) total score which was developed by Beard and Ragheb (1980). The LSS-Short form is comprised of 24 items assessing how one's leisure engagement satisfies their needs (e.g., psychological; educational; social; relaxation; physiological; aesthetic). The LSS uses a 5-point scale ranging from 1 (Almost never true for you) to 5 (Almost always true for you). The LSS has shown good to excellent internal consistency with Cronbach's alpha coefficient of 0.96 for the total score and domain coefficients of 0.86 (psychological), 0.90 (educational), 0.88 (social), 0.85 (relaxation), 0.92 (physiological) and 0.86 (aesthetic; Beard & Ragheb, 1980). Cronbach's alpha for the current sample's total score was shown to be excellent ($\alpha = 0.90$). The LSS has shown evidence for high content validity and good concurrent validity with the Adolescent Leisure Interest Profile (ALIP) and has been used extensively in the neurotypical literature (Trottier, Brown, Hobson, & Miller, 2002; Di Bona, 2000; Beard & Ragheb, 1980).

Results

Data Conditioning

Data conditioning involved screening for data entry errors, univariate and multivariate outliers, and testing assumptions important to consider for multiple regression, as outlined by Tabachnick and Fidell (2013). Univariate outliers were defined as data with Z-scores greater than 3.29 that were discontinuous from the distribution (Tabachnick & Fidell, 2013). Histograms and frequency distributions were used to identify possible univariate outliers on all predictor and criterion variables. Received Formal Support and Adaptive Skills were the only variables found to include univariate outliers. Skewed variables were defined as variables where the skew statistic divided by the standard error was greater than three (Kline, 2011). Received Formal Support had a moderate positive skew and a log transformation was used to correct nonnormality. Adaptive skills was highly negatively skewed and an inverse reflected transformation was used to correct nonnormality. These variables were retained in the model due to their importance in previous research. In addition, they both accurately reflect the experiences of the current sample, highlighting the low availability of services for adults with AST and their high level of daily functioning, and therefore provide useful data to inform the model. After transforming both variables to correct skew, they were re-assessed for outliers; no outliers were detected based on the aforementioned criteria. Multivariate outliers were examined through Mahalanobis distances (Kline, 2011; Tabachnick & Fidell, 2013); no multivariate outliers were found.

Multiple regression analysis also requires that variables meet the assumptions of linearity, homoscedasticity, and the absence of multicollinearity. Histograms and scatterplots of the independent and dependent variables were used to assess linearity and normality, residual plots were used to assess homoscedasticity, and correlation matrices and Variance Inflation Factors (VIF) were used to assess multicollinearity (Cohen, Cohen, West, & Aiken, 2003; Tabachnick & Fidell, 2013). The data met these assumptions, and no transformations were necessary. No predictor variable was missing more than 5% of data. Mean scores were used in place of total scores for variables when one or more participants was missing one or more scale items; mean scores were computed for all participants with at least 80% of items completed. The following predictor variables were computed using mean scores: perceived informal support; leisure satisfaction; sense of coherence; self-efficacy; adaptive behaviour; and life satisfaction. Using a conservative approach, missing items on the AQ were entered as a zero (i.e., missing items were treated as if participants did not endorse the item) before the total score was calculated. Missing items on the WHOQOL-BREF were handled using mean imputation, following the WHOQOL (1998) guidelines, so long as they were not missing more than two items for the psychological, physical and environmental domains and not missing more than one item for the social domain. Four participants had at least one criterion variable that could not be calculated; participants were included as long as they had at least one complete criterion variable. Cases with missing values were excluded from relevant analyses as indicated in the results of each analysis.

Descriptive Statistics and Pearson Correlations

Descriptive statistics, including means and standard deviations, were generated for the criterion variables (i.e., global and each of the four domains of quality of life, life satisfaction) and predictor variables (individual and contextual; see Table 1). The mean

Table 1

Descriptive Statistics for Dependent and Predictor Variables

Variable (Min – Max Value)	Range	Mean (SD) for AST	Mean (SD) for GP (Skevington et al., 2004)
Dependent variables			
Global QoL (1-5)	1-5	3.11(1.05)	
Psychological QoL (4-20)	4.67-16.67	10.53(3.07)	15.0(2.8)***
Social QoL (4-20)	4-20	10.96(4.12)	14.3(3.2)***
Physical QoL (4-20)	4.57-20	11.94(2.87)	16.2(2.9)***
Environmental QoL (4-20)	5-19	12.94(2.94)	13.5(2.6)*
Life satisfaction (5-35)	5-33	16.7(7.55)	
Individual predictor variables			
Level of ASD traits (32-50)	32-47	38.90(4.08)	
Co-occurring MH		73%+	
Self-efficacy (1-4)	1-3.80	2.48(0.57)	
Sense of coherence (1-7)	1.15-5.62	3.09(0.91)	
Biological sex		57%++	
Adaptive skills (0-10)	1-10	8.00(2.01)	
Contextual predictor variables			
Received informal support (3-15)	3-15	10.20(3.78)	
Perceived informal support (1-7)	1-7	4.15(1.49)	
Received formal support (0-6)	0-6	0.87(1.00)	
Perceived formal support (0-6)	0-6	2.02(1.53)	
Employment status		55%+++	
Leisure engagement (0-18)	3-13	7.27(2.20)	
Leisure satisfaction (1-5)	1.08-4.50	3.00(0.62)	

Note. N = 125-131. QoL = quality of life; GP = general population comparison group; MH = mental health. +Percentage with at least 1 co-occurring mental health disorder. ++Percent of biological females. +++Percent employed. ***p<0.001; *p<0.05.

for global quality of life indicates that, on average, adults with AST rated their quality of life between “neither good nor poor” and “poor”. The means for each of the four domains of quality of life indicate that, on average, adults with AST rated their domain-specific quality of life above the midpoint. In terms of life satisfaction, the mean indicates that, on average, adults with AST are “slightly dissatisfied” with life (Diener et al., 1985).

Turning to the individual predictor variables, the adaptive skills ratings indicating participants were able to complete most tasks of daily living “independently or without help”. Most (73%) of the sample indicated they had at least one co-occurring mental health disorder. Finally, adults in this study, on average, identified with statements reflecting high self-efficacy, whereas they identified with statements reflecting a low sense of coherence.

Turning to contextual factors, adults in this sample indicated that they had received at least “some support” from family, friends or a romantic partner and were “neutral” about, or “mildly agreed” with, statements reflecting high perceived informal support. They indicated they had accessed, on average, fewer than one of the six formal support services listed in the previous month; they believed they could access, on average, two of the services listed, if needed. Slightly over half (55%) of adults in this sample indicated they were currently working in some capacity. Most adults in this sample indicated they engaged in solitary activities and hobbies “sometimes” to “often”, social activities “sometimes”, in-home electronic activities “everyday”, outdoor activities "never" to "sometimes", gross-motor activities "never" to "sometimes" and visiting clubs "never". Finally, participants indicated, on average, that statements reflecting high leisure satisfaction were at least "somewhat true" of them.

Relationships among the dependent variables were examined using Pearson Product-Moment correlations (see Table 2). As expected, each quality of life domain was significantly positively related to global quality of life, and to each other. In addition, global quality of life and all 4 domains of quality of life were significantly positively related to life satisfaction. Global quality of life was least correlated with social quality of life, showing a weak positive correlation (r = .39). Life satisfaction was least correlated with physical and environmental quality of life, showing moderate positive correlations (r = .47 and .47). Global quality of life and life satisfaction were most strongly positively correlated with psychological quality of life (r = .73 and .77 respectively).

Pearson correlations between criterion variables and predictor variables are reported in Table 4 – 9. Sense of coherence, leisure satisfaction, and leisure engagement were the most consistently associated with the criterion variables in that they were significantly correlated with all six criterion variables. Formal supports (both received and perceived) and adaptive skills were the least consistently associated with the criterion variables: perceived formal support was not significantly correlated with any criterion variable; received formal support and adaptive skills were only significantly correlated with physical and environmental quality of life. The other predictors showed various patterns of significant relations, depending on the criterion variable.

Table 2

Pearson's Correlation Coefficients between Global Quality of Life (QOL) and Quality of Life Domains

	2	3	4	5	6
(1)Global QoL	0.73***	0.39***	0.62***	0.54***	0.66***
(2)Psychological QoL		0.58***	0.60***	0.51***	0.77***
(3)Social QoL			0.22*	0.30***	0.61***
(4)Physical QoL				0.65***	0.47***
(5)Environmental QoL					0.47***
(6)Life Satisfaction					

Note. N = 129-131. *p <.05; **p <.01; ***p <0.001.

Research Question 1: Group Differences in Domain-Specific Quality of Life

Research Question 1 focused on the levels of domain-specific quality of life of adults with AST in comparison to the general population. Hypothesis 1 predicted lower quality of life on the psychological, physical and social domains of quality of life compared to a sample from the general population. This hypothesis was tested by comparing the current data to Skevington, Lofty and O'Connell's (2004) international field trial of the WHOQOL-BREF in the general population. It is important to note that controlling for Type I error was not prioritized due to exploratory nature of this research question. All significant findings are interpreted cautiously and will require validation in future research.

Four *Z*-tests were conducted. Hypothesis 1 was supported, as adults with AST rated their domain-specific quality of life lower than a general population sample for the

Table 3

Pearson's Correlation Coefficients between Predictor Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
(1)Level of ASD traits	1												
(2)Co-occurring MH	.07	1											
(3)Self-efficacy	-.04	-.21*	1										
(4)Sense of coherence	-.17	-.33***	.42***	1									
(5)Biological sex	-.13	.13	-.04	-.04	1								
(6)Adaptive skills	.04	-.18*	.31***	.07	-.16	1							
(7)Received informal support	-.14	.03	-.03	.14	.21*	-.16	1						
(8)Perceived informal support	-.20*	-.10	.13	.44***	.33***	-.10	.75***	1					
(9)Received formal support	-.13	.27**	-.09	-.13	.14	-.21*	.07	.00	1				
(10)Perceived formal support	-.16	.07	.09	.08	-.07	-.01	.06	.04	.37***	1			
(11)Employment status	.02	-.23**	.18*	.14	-.14	.27**	-.15	-.04	-.17	-.05	1		
(12)Leisure engagement	.09	-.05	.18*	.24**	-.01	.00	.11	.28**	-.01	.07	.11	1	
(13)Leisure satisfaction	-.08.	-.15	.34***	.40***	.19*	.07	.33***	.49***	-.00	.10	.03	.40***	1

Note. n = 125-131. * $p < .05$. ** $p < .01$. *** $p < .001$.

three hypothesized domains: psychological ($Z = -16.58$, $p < .001$), physical ($Z = -17.00$, $p < .001$) and, social ($Z = -9.22$, $p < .001$). In addition, adults with AST also rated their environmental quality of life lower than the general population sample ($Z = -2.18$, $p < .05$). Taken together, the results indicate that adults with AST, on average, reported domain-specific quality of life lower than did a general population sample.

Research Question 2: Individual and Contextual Predictors of Quality of Life

Research Question 2 examined the extent to which individual and contextual factors are associated with quality of life of adults with AST. Hypotheses 2-7 made specific predictions about which individual and contextual predictors would be uniquely related to life satisfaction, and global and domain quality of life. These hypotheses were tested using six multiple regression analyses, one for life satisfaction, one for the global quality of life score, and one for each domain of quality of life. In each multiple regression, all individual and contextual predictor variables were entered in one block. All predictor variables were included in each multiple regression analysis. This approach was selected in order to provide a comprehensive and holistic understanding of the factors related to the quality of life of adults with AST and provide uniformity across the dimensions of quality of life examined. Also, given the novelty of specific predictors and paucity of previous research, it allowed for the identification of unexpected relationships that may be present.

The first regression analysis examined the predictive ability of individual and contextual factors with respect to life satisfaction (see Table 4). Hypothesis 2 predicted that absence of a co-occurring mental health disorder, greater self-efficacy, greater sense of coherence, higher adaptive skills, higher perceived and received levels of formal and informal support, being currently employed, higher leisure engagement, and higher leisure satisfaction would be related to higher life satisfaction of adults with AST. Hypothesis 7 was partially supported; the result of the regression analysis was significant showing that the model explained 60% of the variance in life satisfaction. As expected, absence of a co-occurring mental health disorder, greater self-efficacy, greater sense of coherence, higher perceived and received levels of informal support, being currently employed, higher leisure engagement, and higher leisure satisfaction were all significantly correlated

Table 4

Regression Analysis Predicting Life Satisfaction

Predictors	**ΔR^2**	**F**	***r***	***sr***	**β**
Model	.60***	12.65***			
Level of ASD Traits			-.23**	-.08	-.09
Co-occurring MH			-.29**	-.10	-.10
Self-efficacy			.38***	.11	.13
Sense of coherence			.64***	.28**	**.37****
Biological sex			.25*	.15*	**.17***
Adaptive skills			-.05	-.13	-.13
Leisure satisfaction			.47***	.06	.08
Perceived informal support			.56***	.09	.19
Received informal support			.33***	.03	.05
Perceived formal support			.03	.01	-.00
Received formal support			-.12	-.06	-.61
Employment status			.19*	.14*	**.15***
Leisure engagement			.29**	.06	.08

Note. N = 125. * *p* < .05. ** *p* < .01. *** *p* < .001.

with high life satisfaction. Of the hypothesized predictors, only adaptive skills and formal supports were not correlated with life satisfaction. However, higher sense of coherence and being employed were the only hypothesized predictors uniquely associated with greater life satisfaction in the comprehensive model. In addition, biological sex (i.e., being female) was also significant in the regression equation.

The second regression analysis examined the predictive ability of individual and contextual factors with respect to global quality of life (see Table 5). Hypothesis 3

Table 5

Regression Analysis Predicting Global Quality of Life

Predictors	**ΔR^2**	**F**	***r***	***sr***	**β**
Model	.46***	7.27***			
Level of ASD Traits			-.26**	-.17*	**-.18***
Co-occurring MH			-.21**	-.05	-.05
Self-efficacy			.30**	.01	.01
Sense of coherence			.58***	.30***	**.40*****
Biological sex			.12	.03	.04
Adaptive skills			.02	-.04	-.03
Leisure satisfaction			.45***	.13	.17
Perceived informal support			.42*	.05	.10
Received informal support			.20***	-.03	-.04
Perceived formal support			.11	.02	.02
Received formal support			-.01	.02	.03
Employment status			.12*	.06	.06
Leisure engagement			.32***	.13	.15

Note. *N* = 124. * *p* < .05. ** *p* < .01. *** *p* < .001.

predicted that absence of a co-occurring mental health disorder, greater self-efficacy, greater sense of coherence, higher adaptive skills, higher perceived and received levels of formal and informal support, being currently employed, higher leisure engagement and higher leisure satisfaction would be related to higher global quality of life of adults with AST. Hypothesis 3 was partially supported; the results of the regression analysis indicate that the model was significant and explained 46% of the variance in global quality of life. As expected, absence of a co-occurring mental health disorder, greater self-efficacy, greater sense of coherence, higher perceived and received levels of informal support, being currently employed, higher leisure engagement and higher leisure satisfaction were correlated with higher global quality of life of adults with AST. Of the hypothesized predictors, only adaptive skills and formal supports were not correlated with global quality of life. Higher sense of coherence was the only hypothesized predictor that was significant in the regression equation. Unexpectedly given previous research, lower levels of ASD traits was also uniquely associated with higher global quality of life.

The third regression analysis examined the predictive ability of individual and contextual factors with respect to psychological quality of life (see Table 6). Hypothesis 4 predicted that lower levels of ASD traits, absence of a co-occurring mental health disorder, greater self-efficacy, greater sense of coherence, biological males, higher leisure engagement and higher leisure satisfaction would be related to higher psychological quality of life of adults with AST. Hypothesis 3 was partially supported; the results of the regression analysis for psychological quality of life indicated that the model significantly predicted psychological quality of life, explaining 61% of the variance. As expected, lower levels of ASD traits, absence of a co-occurring mental health disorder, greater self-efficacy, greater sense of coherence, higher leisure engagement and higher leisure satisfaction were associated with greater psychological quality of life. Being biologically male was not associated with the dependent variable. However, higher sense of coherence and greater leisure satisfaction were the only hypothesized predictors uniquely associated with higher psychological quality of life in the comprehensive model.

The fourth regression analysis examined the predictive ability of individual and contextual factors with respect to physical quality of life (see Table 7). Hypothesis 5 predicted that higher perceived and received levels of formal and informal support, being male, being currently employed, higher leisure engagement and higher leisure satisfaction would be related to higher physical quality of life of adults with AST. Hypothesis 5 was partially supported; the results of the regression analysis for physical quality of life indicated that the model explained 52% of the variance and was a significant predictor of physical quality of life. As expected, higher received levels of formal support, biological sex (i.e., being male), being currently employed, higher leisure engagement and higher leisure satisfaction higher sense of coherence were associated with higher physical quality of life. Perceived formal support and perceived and received informal support were not associated with the dependent variable. Co-occurring mental health, self-efficacy, sense of coherence, and adaptive skills were also associated with physical quality of life. However, only sense of coherence was the only significant predictor in the regression equation.

The fifth regression analysis examined the predictive ability of individual and contextual factors with respect to social quality of life (see Table 8). Hypothesis 6 predicted that biological sex (i.e., being female), higher perceived levels of formal and

Table 6

Regression Analysis Predicting Psychological Quality of Life

Predictors	ΔR^2	F	*r*	*sr*	β
Model	.61***	13.21***			
Level of ASD Traits			-.22*	-.10	-.11
Co-occurring MH			-.28**	-.06	-.07
Self-efficacy			.39***	.08	.10
Sense of coherence			.68***	.33***	**.44*** **
Biological sex			.17	.02	.03
Adaptive skills			.04	-.06	-.06
Leisure satisfaction			.53***	.16**	**.21** **
Perceived informal support			.51**	.07	.14
Received informal support			.28***	.02	.03
Perceived formal support			-.01	-.11	-.11
Received formal support			-.11	-.01	-.01
Employment status			.18*	.09	.08
Leisure engagement			.28**	.05	.05

Note. $N = 124$. * $p < .05$. ** $p < .01$. *** $p < .001$.

informal support, higher leisure engagement and higher leisure satisfaction would be related to higher social quality of life of adults with AST. Hypothesis 6 was partially supported; the results of the regression analysis for social quality of life indicated that the model was significant and explained 64% of the variance for social quality of life. As expected, biological sex (i.e., being female), higher perceived levels of formal and informal support, higher leisure engagement and higher leisure satisfaction were all associated with greater social quality of life as were received informal support and sense

Table 7

Regression Analysis Predicting Physical Quality of Life

Predictors	**ΔR^2**	**F**	***r***	***sr***	**β**
Model	.52***	9.39***			
Level of ASD Traits			-.11	-.07	-.07
Co-occurring MH			-.35**	-.09	-.10
Self-efficacy			.38***	-.00	-.01
Sense of coherence			.62***	.37***	**.51*** **
Biological sex			-.18*	-.10	-.11
Adaptive skills			.26***	.10	.11
Leisure satisfaction			.34***	.10	.13
Perceived informal support			.16	-.04	-.08
Received informal support			-.04	-.04	-.07
Perceived formal support			.09	.04	.05
Received formal support			-.21*	-.05	-.07
Employment status			.28**	.10	.11
Leisure engagement			.30***	.13	.14

Note. $N = 125$. * $p < .05$. ** $p < .01$. *** $p < .001$.

of coherence. As hypothesized, being female, higher perceived informal support, and higher leisure satisfaction were uniquely associated with higher social quality of life. Unexpectedly, higher sense of coherence was also significant in the regression equation.

The sixth regression analysis examined the predictive ability of individual and contextual factors with respect to environmental quality of life (see Table 9). Hypothesis 7 predicted that greater self-efficacy, greater sense of coherence, higher adaptive skills,

Table 8

Regression Analysis Predicting Social Quality of Life

Predictors	ΔR^2	F	*r*	*sr*	β
Model	.64***	15.00***			
Level of ASD Traits			-.15	.02	.01
Co-occurring MH			-.08	.03	.03
Self-efficacy			.17	-.04	-.05
Sense of coherence			.49***	.18**	**.23****
Biological sex			.35***	.12*	**.15***
Adaptive skills			-.04	.01	.02
Leisure satisfaction			.56***	.21***	**.26*****
Perceived informal support			.72***	.24***	**.47*****
Received informal support			.52***	.01	.03
Perceived formal support			.07	-.03	-.01
Received formal support			.01	.04	.03
Employment status			.05	.07	.06
Leisure engagement			.21*	-.08	-.10

Note. N = 123. * $p < .05$. ** $p < .01$. *** $p < .001$.

higher perceived and received levels of formal and informal support, being currently employed, higher leisure engagement and higher leisure satisfaction would be related to higher environmental quality of life of adults with AST. Hypothesis 7 was partially supported; the results of the regression analysis for environmental quality of life indicated that the model explained 39% of the variance and was a significant predictor of environmental quality of life. As expected, greater self-efficacy, greater sense of coherence, higher adaptive skills, higher perceived and received levels of formal and informal support, higher leisure engagement and higher leisure satisfaction were associated with greater environmental quality of life. Being employed, received informal support and perceived formal support were not associated with the dependent variable. Unexpectedly, lower levels of ASD traits, absence of co-occurring mental health and being biologically male were also associated with environmental quality of life. However, higher sense of coherence and greater adaptive skills were the only hypothesized predictors uniquely associated with higher environmental quality of life in the comprehensive model.

Table 9

Regression Analysis Predicting Environmental Quality of Life

Predictors	**ΔR^2**	**F**	***r***	***sr***	**β**
Model	.39***	5.35***			
Level of ASD Traits			-.18*	-.12	-.12
Co-occurring MH			-.28**	-.06	-.07
Self-efficacy			.36***	.05	.07
Sense of coherence			.50***	.22**	**.31****
Biological sex			-.16*	-.14	-.16
Adaptive skills			.29***	.16*	**.17***
Leisure satisfaction			.31***	.08	.10
Perceived informal support			.24**	.04	.07
Received informal support			.09	-.01	-.00
Perceived formal support			.17	.12	.14
Received formal support			-.17*	-.09	-.11
Employment status			.17	.02	.03
Leisure engagement			.17*	.02	.02

Note. $N = 125$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Research Question 3: Leisure Satisfaction as a Mediator between Leisure Engagement and Quality of Life

Research Question 3 examined whether leisure satisfaction mediates the relationship between leisure engagement and quality of life of adults with AST. Hypotheses 8 predicted that leisure satisfaction would mediate the relationship between leisure engagement and life satisfaction, and global and domain-specific quality of life of adults with AST. These hypotheses were tested by evaluating the mediation models using the procedure outlined by Hayes (2013) for mediation relationships. Specifically, mediation analysis with bootstrapping (based on 5000 samples) was conducted using SPSS PROCESS yielding 95% bias-corrected confidence interval's (BCa CI) for the relative indirect effects. A mediation effect can be considered significant if the BCa CI for the relative standardized effect does not comprise zero (Field, 2009).

Hypothesis 8 was supported for life satisfaction. First, the total effect of leisure engagement on life satisfaction, ignoring the mediator, was significant, $b = 0.20$, $t(129) = 3.38$, $p < .001$. Next, the direct effect showed that the effect of leisure engagement on life satisfaction, when leisure satisfaction was included in the model, was not significant, $b = 0.08$, $t(129) = 1.44$, $p > .05$. Finally, the indirect effect of leisure engagement on life satisfaction showed confidence intervals which did not include zero, $b = 0.11$, BCa CI [0.05, 0.18]; therefore, there is a significant indirect effect of leisure engagement on life satisfaction through leisure satisfaction. The effect size, based on the standardized indirect effect, shows that the indirect effect was 16.24% of the maximum value, $b = 0.16$, BCa CI [0.08, 0.25]. Taken together, these findings support Hypothesis 8 showing that leisure satisfaction mediates the relationship between leisure engagement and life satisfaction (see Table 10 & Figure 2).

Hypothesis 8 was also supported for global quality of life. First, the total effect of leisure engagement on global quality of life, ignoring the mediator, was significant, $b = 0.26$, $t(128) = 3.96$, $p < .001$. Next, the direct effect showed that the effect of leisure engagement on global quality of life, when leisure satisfaction was included in the model, was also significant, $b = 0.14$, $t(128) = 2.15$, $p < .05$. Finally,

Table 10

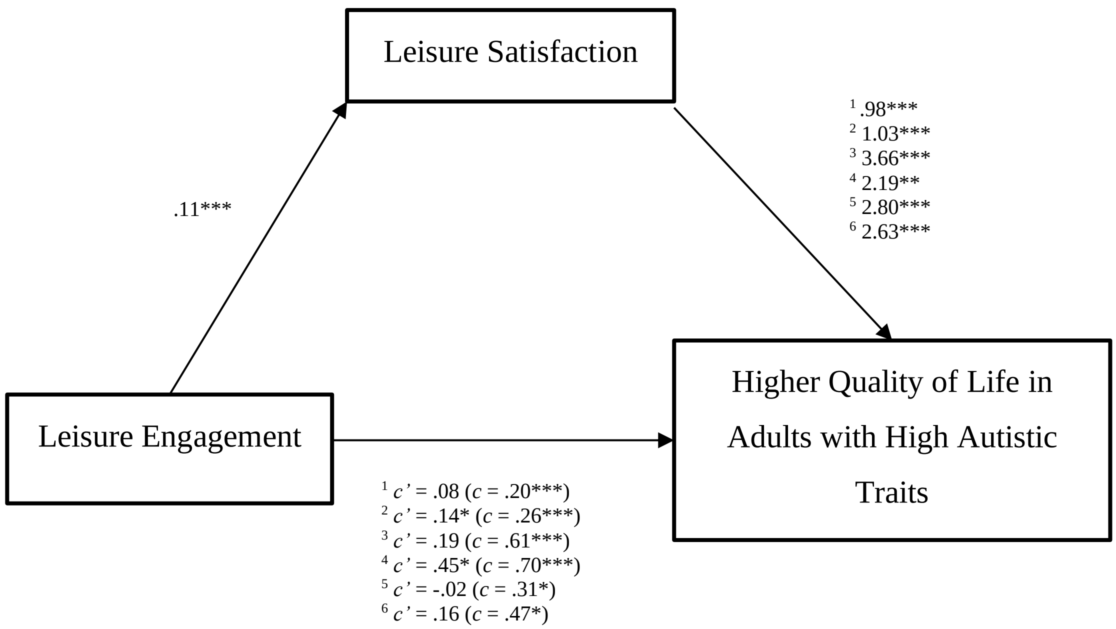
Effects of Leisure Engagement on Quality of Life Through Leisure Needs Fulfilment (Unstandardized Estimates)

		BC[a] 95% CI			BC[a] 95% CI			BC[a] 95% CI	
	Direct effect	Lower	Upper	Indirect effect	Lower	Upper	Total effect	Lower	Upper
LE [1]	0.08	-0.03	0.20	0.11 [b]	0.05	0.18	0.20 [b]	0.08	0.31
LE [2]	0.14 [b]	0.01	0.27	0.12 [b]	0.06	0.19	0.26 [b]	0.13	0.39
LE [3]	0.19	-0.15	0.53	0.42 [b]	0.23	0.66	0.61 [b]	0.26	0.96
LE [4]	0.45 [b]	0.05	0.85	0.25 [b]	0.07	0.57	0.70 [b]	0.32	1.08
LE [5]	-0.02	-0.24	0.21	0.32 [b]	0.19	0.47	0.31 [b]	0.07	0.54
LE [6]	0.16	-0.32	0.65	0.30 [b]	0.08	0.58	0.47 [b]	0.01	0.93

Note. N = 131. Results are based on 5,000 bootstrap samples. LE = leisure engagement. [a] Bias-corrected confidence intervals. [b] An effect that is supported as indicated by a confidence interval that does not include zero. [1] Life satisfaction [2] Global quality of life. [3] Psychological quality of life. [4] Physical quality of life. [5] Social quality of life. [6] Environmental quality of life.

Figure 2

Leisure Satisfaction as a Mediator of the Relationship Between Leisure Engagement and Quality of Life in Adults with High Autistic Traits



Note. Model illustrating the mediating role played by leisure satisfaction in the relationship between leisure engagement and quality of life. [1] Life Satisfaction, [2] Global Quality of Life, [3] Psychological Quality of Life, [4] Physical Quality of Life, [5] Social Quality of Life, [6] Environmental Quality of Life. All values displayed are unstandardized path coefficients. N = 131, *$*p$ < .05, $**p$ < .01, $***p$ <.001*

the indirect effect of leisure engagement on global quality of life showed a confidence interval which did not include zero, b = 0.12, BCa CI [0.06, 0.19]. The effect size, based on the standardized indirect effect, shows that the indirect effect was 14.75% of the maximum value, b = 0.15, BCa CI [0.07, 0.24]. Taken together, these findings support

Hypothesis 8 showing that leisure satisfaction mediates the relationship between leisure engagement and global quality of life (see Table 10 & Figure 2).

Hypothesis 8 was also supported for psychological quality of life. First, the total effect of leisure engagement on psychological quality of life, ignoring the mediator, was significant, $b = 0.61$, $t(128) = 3.42$, $p < .001$. Next, the direct effect showed that the effect of leisure engagement on psychological quality of life, when leisure satisfaction was included in the model, was not significant, [$b = 0.08$, $t(128) = 1.44$, $p > .05$]. Finally, the indirect effect of leisure engagement on psychological quality of life showed a confidence interval which did not include zero, $b = 0.42$, BCa CI [0.23, 0.66]. The effect size, based on the standardized indirect effect, shows that the indirect effect was 19.96% of the maximum value, $b = 0.20$, BCa CI [0.11, 0.31]. Taken together, these findings support Hypothesis 8 showing that leisure satisfaction mediates the relationship between leisure engagement and psychological quality of life (see Table 10 & Figure 2).

Hypothesis 8 was also supported for physical quality of life. First, the total effect of leisure engagement on physical quality of life, ignoring the mediator, was significant, $b = 0.70$, $t(129) = 3.65$, $p < .001$. Next, the direct effect showed that the effect of leisure engagement on physical quality of life, when leisure satisfaction was included in the model, was also significant, $b = 0.45$, $t(129) = 1.22$, $p < .001$. Finally, the indirect effect of leisure engagement on physical quality of life showed a confidence interval which did not include zero, $b = 0.25$, BCa CI [0.07, 0.47]. The effect size, based on the standardized indirect effect, shows that the indirect effect was 10.85% of the maximum value, $b = 0.11$, BCa CI [0.03, 0.20]. Taken together, these findings support Hypothesis 8 showing that leisure satisfaction mediates the relationship between leisure engagement and physical quality of life (see Table 10 & Figure 2).

Hypothesis 8 was also supported for social quality of life. First, the total effect of leisure engagement on social quality of life, ignoring the mediator, was significant, $b = 0.31$, $t(127) = 2.52$, $p < .001$. Next, the direct effect showed that the effect of leisure engagement on social quality of life, when leisure satisfaction was included in the model, was also significant, $b = -0.02$, $t(127) = -0.16$, $p < .05$. Finally, the indirect effect of leisure engagement on social quality of life showed a confidence interval which did not include zero, $b = 0.32$, BCa CI [0.19, 0.47]. The effect size, based on the standardized indirect effect, shows that the indirect effect was 23.18% of the maximum value, $b = 0.23$, BCa CI [0.14, 0.34]. Taken together, these findings support Hypothesis 8 showing that leisure satisfaction mediates the relationship between leisure engagement and social quality of life (see Table 10 & Figure 2).

Hypothesis 8 was also supported for environmental quality of life. First, the total effect of leisure engagement on environmental quality of life, ignoring the mediator, was significant, $b = 0.47$, $t(129) = 2.01$, $p < .001$. Next, the direct effect showed that the effect of leisure engagement on environmental quality of life, when leisure satisfaction was included in the model, was not significant, $b = 0.16$, $t(129) = 0.67$, $p > .05$. Finally, the indirect effect of leisure engagement on environmental quality of life showed a confidence interval which did not include zero, $b = 0.30$, BCa CI [0.08, 0.58]. The effect size, based on the standardized indirect effect, shows that the indirect effect was 11.21% of the maximum value, $b = 0.11$, BCa CI [0.03, 0.21]. Taken together, these findings support Hypothesis 8 showing that leisure satisfaction mediates the relationship between leisure engagement and environmental quality of life (see Table 10 & Figure 2).

Discussion

The current study aimed to evaluate the association of specific individual and contextual factors with the subjective quality of life of adults with AST. Three central goals were used to structure this investigation: to examine the levels of life satisfaction and quality of life of adults with AST, both globally and across specific domains; to assess the associations of selected individual and contextual factors with the quality of life of these adults; to investigate the potential mediating role of leisure satisfaction in the relationship between leisure engagement and quality of life. By proposing and substantiating a comprehensive model predictive of all six domains of quality of life, the current study makes a valuable contribution to the literature. Notably, although most predictors displayed the expected correlations with domains of quality of life, their significant association within a comprehensive model was not always significant. This finding underscores the importance of this study, which is distinctive in its investigation of predictor variables as part of a comprehensive model, thereby helping to identify the most crucial predictors for understanding the quality of life of adults with AST. Significantly, and in line with expectations, the model successfully life satisfaction, global quality of life and the domains of psychological, physical, social, and environmental quality of life. The results not only validate the comprehensive model proposed by the current study but also identify several novel and potentially modifiable unique predictors of quality of life of adults with AST and provide insight supporting a deeper understanding of quality of life in this population.

Level of Quality of Life in Adults with AST

The first goal of the current study was to explore the levels of life satisfaction, global quality of life and domain-specific quality of life of adults with AST. In the current study, adults with AST rated their life satisfaction as marginally below neutral or slightly dissatisfied, and their global quality of life as marginally above neutral, or slightly good. When individual domains of quality of life were examined, adults with AST rated their psychological quality of life the lowest, followed by social, physical and then environmental quality of life. Adults with AST self-reported domain-specific quality of life falling slightly below neutral for psychological, social, and physical quality of life and slightly above neutral for environmental quality of life.

When domain-specific ratings of quality of life were compared to a previously published general population sample, adults with AST reported lower quality of life relative to the comparison sample. In line with hypothesis 1, adults with AST rated their psychological, social and physical quality of life lower than the general population (Skevington et al., 2004). Highlighting the substantial discrepancy in quality of life compared to the general population, adults with AST rated their quality of life at least one standard deviation lower than the general population in each of the psychological, social and physical domains. Interestingly, and providing clarity to the mixed results of previous small sample research (Jennes-Coussens et al., 2006; Kamp-Becker et al., 2010; Lin, 2014), the current study also demonstrated lower ratings of environmental quality of life for adults with AST (Skevington et al., 2004). In the current study, the discrepancy between ratings of adults with AST and the general population was smallest for the environmental domain (small effect; cohen's d = 0.22); therefore, the aforementioned studies may not have had the power to consistently detect this small effect. It is important to note that the current study did not control for Type I error; therefore, future research should be undertaken to confirm this relationship. Nevertheless, this discrepancy is cogent given the barriers faced by adults with AST (e.g., access to health and social services; transportation; financial resources) which would intuitively impact perceptions of their environment.

The finding that adults with AST in the current study have lower domain-specific quality of life than the general population is in line with previous research (Jennes-Coussens et al., 2006; Kamio et al., 2013; Kamp-Becker et al., 2010) and in line with the challenges faced by adults with AST. Adults with AST have high rates of co-occurring mental health disorders, are not always able to live independently, experience difficulties with social relationship, are often un- or under-employed, and may have limitations in their leisure participation, mobility, and adaptive functioning (Helles et al., 2017; Howlin et al., 2004). All of these are factors that contribute to the domains of quality of life as defined by the WHO (1997), and therefore, expectantly led to depressed domain-specific quality of life in adults with AST. Overall, the findings of the current study support the notion that adults with AST rate their quality of life, across all domains, lower than the general population, highlighting the importance of understanding factors that may be associated with these important outcomes.

Individual and Contextual Predictors of Quality of Life

The second goal of the current study was to identify individual and contextual predictors of life satisfaction, global quality of life, and domain-specific quality of life of adults with AST. A bio-ecological framework alongside previous literature was used to select relevant variables. Following the third goal of the current study, predictors included modifiable factors that were expected to be related to higher quality of life for adults with AST. Six individual factors (i.e., level of ASD traits, mental health, self-efficacy, sense of coherence, adaptive skills, biological sex) and seven contextual factors (i.e., perceived and received levels of formal and informal support, employment status, leisure engagement, satisfaction) were selected for evaluation.

Individual Variables

Level of ASD traits. Results from the current study demonstrated that level of ASD traits was associated with psychological quality of life; however, results did not support the hypothesis that the unique amount of variance accounted for by ASD traits was significantly predictive of psychological quality of life in the comprehensive model. Additionally, level of ASD traits was demonstrated to be a unique predictor of global quality of life. The current study examined the level of ASD traits as a global measure encompassing social communication and restricted and repetitive behaviours. The use of a global measure may explain the predictive relationship found for global and not psychological quality of life. Adults with AST who perceive higher levels of overall ASD traits may experience a lower global quality of life, whereas this broad view of traits may not be specific enough to predict domain-specific psychological quality of life. This is consistent with previous research showing no relationship between global level of ASD traits and psychological quality of life (Kamp-Becker et al., 2010) as well as research showing that the individual ASD traits of insistence on sameness and reduced social contact were negatively related to psychological quality of life (Deserno et al., 2017). It is possible that the global measure of ASD traits used here was not as sensitive to differences in psychological quality of life as the trait-specific measures used by Deserno and colleagues (2017) and, therefore, did not show the same findings.

The finding that level of ASD traits was predictive of global quality of life is consistent with previous research by Kamp-Becker and colleagues (2010), but inconsistent with that of Renty and Roeyers (2006). This inconsistency may be explained by the differences in the samples of each study. Renty and Roeyers' (2006) sample reported a substantially lower level of ASD traits, with the mean falling below the minimum cut-off typically used for clinical populations and that was employed in the current study (AQ cut-off = 32). Kamp-Becker and colleagues (2010) used the Autism Diagnostic Observation Schedule (ADOS) to confirm the presence of clinically significant symptoms of ASD in their sample. It may be that the sub-clinical symptoms reported by Renty and Roeyers (2006) were not sufficient to have a significant association with their sample's quality of life. Based on the results of Kamp-Becker and colleagues (2010), as well as the current study, it appears as though level of ASD traits is an important factor to consider when considering the global quality of life of adults with AST.

Co-occurring mental health disorders. Co-occurring mental health disorders (e.g., anxiety, depression) are common in adults with AST (Lugnegard, Hallerback & Gillberg, 2011; Yarar et al., 2022) and have been shown to be negatively associated with their quality of life (Hells et al., 2017; Lin, 2014). It was hypothesized that co-occurring mental health disorders would predict lower global and psychological quality of life. As expected, results from the current study demonstrated that co-occurring mental health disorders were significantly negatively correlated with both global and psychological quality of life. However, the results from the current study did not directly support the hypotheses as co-occurring mental health disorders were not shown to predict global and psychological quality of life in a comprehensive model with other predictors. This is in contrast to the significant associations of mental health shown in previous research (Hells et al., 2017; Lin, 2014). It may be that the dichotomous variable of co-occurring mental health disorders employed in the current study (i.e., yes/no) reduced the predictive relationship between mental health disorders and quality of life. Other factors related to mental health (e.g., severity of co-occurring disorders; presence of multiple disorders; internalizing vs. externalizing disorders) may still be predictive of the quality of life of adults with AST. For example, internalizing issues have been linked to greater mood and social relationship problems than externalizing disorders (Woodman et al., 2016). The significant bivariate correlation without predictive ability in the context of other variables may also indicate the presence of complex relationships between mental health and other predictor variables. For example, co-occurring mental health disorders may lead to poorer sense of coherence and thereby contribute to lower quality of life. Future research is needed to evaluate these potential relationships.

Self-efficacy and sense of coherence. This was the first study to explore self-efficacy and sense of coherence as predictors of quality of life in adults with AST. Self-efficacy has been shown to be a significant predictor of quality of life in the general population (Lent et al., 2018; Lent & Brown, 2008) as has sense of coherence (Eriksson & Lindstrom, 2007; Langeland et al., 2007). Self-efficacy reflects an individual's perception of their ability to handle novel or difficult situations and adapt to obstacles that may arise (Domasio et al., 2016; Schwarzer & Jerusalem, 1995). Sense of coherence involves the extent to which an individual perceives an enduring feeling of confidence that their life is structured, predictable, manageable and meaningful (Antonovsky, 1987; Olsson, Hansson, Lundblad & Cederblad, 2006). Adults with AST face many challenges in life not experienced by the general population and these challenges may lead to disorganization, to feeling overwhelmed, and to not feeling in control of one's life circumstances (Guillot & Standen, 2007). Individuals with a strong sense of self-efficacy and sense of coherence would be expected to be better able to cope with these challenges and therefore experience a greater quality of life. In line with expectations, self-efficacy and sense of coherence were significantly correlated with life satisfaction, global, psychological and environmental quality of life as well the physical (sense of coherence and self-efficacy) and social (sense of coherence) domains. However, unexpectedly, sense of coherence demonstrated a predictive relationship with all six measures of quality of life while self-efficacy was not predictive of any of the hypothesized domains when sense of coherence and other variables were included in the models.

Although distinct constructs, both self-efficacy and sense of coherence involve confidence in one's ability to manage the demands of daily life, and the two predictors were moderately correlated in the current study. Methodologically, the inclusion of sense of coherence may be obscuring the contributions of self-efficacy to quality of life in adults with AST. Although the unique variance accounted for by self-efficacy was not a significant predictor of quality of life in adults with AST, the positive associations with the expected domains suggests that while self-efficacy is related to quality of life, other variables, namely sense of coherence, may be more important predictors in a comprehensive model.

Sense of coherence is more broadly defined than self-efficacy, incorporating not only confidence in one's ability, but also in the predictability and meaningfulness of daily life, as well as manageability of demands (Ward & Esposito, 2018; Olsson et al., 2006). This broader view may be responsible for the findings of the current study. Following the definition of quality of life as an individual's perception of their position in life including their personal beliefs and values (WHO, 1997), the narrower focus of self-efficacy may not as fully contribute to quality of life as sense of coherence. The additional considerations of meaningfulness and manageability included in sense of coherence are inherently contributory and may explain the robustness of its predictive relationship.

Individuals who feel their lives are predictable and manageable, and who are able to view challenges in the context of a meaningful life are likely to experience a higher quality of life. Sense of coherence was not only predictive of all measures of quality of life, it was also the strongest predictor of life satisfaction, and global, psychological, physical and environmental quality of life. Higher sense of coherence involves an increased sense of control and predictability in life and has been shown to be an important factor in improving the overall quality of life of adults with chronic conditions such as schizophrenia, coronary heart disease, and physical disabilities (Moons & Norekval, 2006; Langeland et al., 2007). Given the rigidity, preference for routine and insistence on sameness (Seltzer, Shattuck, Abbetudo & Greenberg, 2004) experienced by adults with AST, a sense of control and predictability inherent in high sense of coherence may lead to a higher quality of life for adults with AST. Previous research has demonstrated that higher sense of coherence predicts lower levels of stress, worry, and negative emotions as well as increased diversity and use of coping strategies (Helles et al., 2016; Sarenmalm et al., 2011). Lower levels of stress and negative emotionality paired with increased coping skills may lead to improved mental health, physical health and energy which could, in turn, lead to higher psychological and physical quality of life. Further, sense of coherence bolsters confidence in one's ability to handle challenges and overcome difficult situations (Moons & Norekval, 2006) and thus may lead an individual to feel more in control of their environment. Individuals with higher sense of coherence tend to perceive they have greater resources to draw on to handle difficult situations, including social relationships and supports (Moons & Norkeval, 2006) which, in turn, have been shown to lead to higher levels of social and environmental quality of life (Kamio et al., 2013; Renty & Roeyers, 2006). These rationales add potential explanatory support for the findings and also highlight the potential existence of complex relationships between sense of coherence and other variables (e.g., co-occurrence of mental health disorders; social supports) which should be followed-up on in subsequent research. As a novel predictor of quality of life, sense of coherence adds substantially to the literature and introduces an important predictor in the quality of life of adults with AST. In fact, given the strong predictive relationships observed in the current study, sense of coherence, a modifiable variable, should be prioritized for further study. Future research should aim to identify avenues for increasing sense of coherence both directly and indirectly through modifications to the environment which may afford a better sense of coherence for adults with AST (e.g., autistic informed employment policies; sensory adapted shopping). Additionally, future research should include longitudinal studies aimed at further validating the important relationship between sense of coherence and quality of life.

Adaptive skills. Challenge with adaptive functioning is a commonly associated characteristic of adults with AST (APA, 2013; Kamp-Becker et al., 2010); therefore, higher levels of adaptive skills were expected to predict higher life satisfaction, and higher global and environmental quality of life. The current study found partial support for these hypotheses showing that adaptive skill was a significant predictor of environmental quality of life but was not associated with life satisfaction or global quality of life. Adaptive skills play an important role in how individuals' function in their environment (e.g., tasks of daily living), which in turn, could lead to higher environmental quality of life. Intuitively, adults with AST who are able to effectively utilize and maintain their environmental resources (e.g., household chores, meal preparation, financial management) may experience a higher environmental quality of life; however, more research is needed to confirm this assumption. Surprisingly, adaptive skills were not associated with life satisfaction or global quality of life, which is in contrast to previous research (Billsteadt et al., 2011; Chiang & Wineman, 2014; Kamp-Becker et al., 2010). Notably, previous studies largely examined samples with an associated intellectual impairment and substantial deficits in adaptive functioning. In the current study, adults with AST generally rated their adaptive skills as quite high; the majority of adults with AST's ratings fell near the top of the range on the full version of the W-ADL. Due to the relative independence of the current sample, it is notable that even within this narrow range, the adaptive skills of adults with AST were predictive of lower environmental quality of life. For those with greater independence, such as those included in the current study, minor differences in adaptive skills between individuals may not be sufficiently impactful in their lives (e.g., able to live fully independently) with regard to global quality of life and life satisfaction. However, they may lead to discrepancies when individuals reflect specifically on their environmental quality of life. These findings suggest that even adults with AST who have strong adaptive skills may benefit from further increasing their competence and, thereby, their environmental quality of life.

Biological sex. It was anticipated that being biologically male would predict higher psychological and physical quality of life whereas being biologically female would predict higher social quality of life. The results of the current study did not support these hypotheses for biological males with respect to psychological quality of life but did support support these hypothesis for biological males with respect to physical quality of life. The results also supported these hypotheses with respect to a predictive relationship between biological females and higher social quality of life. In addition to the hypothesized relationships, being biologically female was also shown to predict higher life satisfaction. Within AST samples, men generally have higher rates of full-time employment and lower levels of co-occurring mental health disorders, while women have higher social functioning (Mason et al., 2018; Taylor et al., 2019; D'Entremont et al., 2014). It is these correlates that are generally thought to explain biological sex's relationship to quality of life. However, in the current study, biological sex was not associated with employment or co-occurring mental health disorders. This may explain the failure to find support for the hypothesized relationships for biological males.

In contrast, being biological female in the current study was significantly associated with reporting higher levels of informal social supports, suggesting higher social functioning. It was also predictive of higher social quality of life and life satisfaction. These findings are in line with previous research (Mason et al., 2018; Skevington et al., 2004) showing a significant relationship between women and higher social quality of life. Autistic women tend to be more socially motivated and better at maintaining friendships than autistic men (Bargiela, et al., 2016), and women with AST have been shown to be more likely to have been in a long-term relationship than men with AST (D'Entremont et al., 2014). These findings suggest that women may be more socially adept and experience less challenge with social relationships than men, which may in turn contribute to their higher social quality of life. This social explanation highlights the potential existence of complex relationships between the predictors of biological sex and informal support which could be investigated in future research. The finding that being female predicted higher life satisfaction, but not global quality of life is also in line with previous research in the general population showing that women rate higher life satisfaction while men rate higher global quality of life (Cherapanov et al., 2010; Graham & Chattopadhyay, 2013).

Contextual Variables

Levels of support. In the current study, level of support was subdivided into four categories based on informal (i.e., friends; family; romantic partners) and formal (e.g., employment and educational programs, medical professionals, etc.) supports and considered individuals' perception of the availability of supports versus reception of supports. Given the challenges experienced by adults with AST, including the formation and maintenance of social relationships as well as the barriers to accessing services (Howlin & Magiati, 2017; Magiati, Xiang, Howlin, 2016) it was anticipated that higher levels of support would be related to higher quality of life across various domains. In line with expectations, perceived informal support was correlated with all of the expected domains while received informal support was correlated with life satisfaction and global, social and psychological quality of life. Although received formal support was correlated with the physical and environmental domains, it was not correlated with life satisfaction or global quality of life. Perceived formal support was not significantly correlated with any domains of quality of life. Despite several positive correlations, the only support variable whose unique relationship with quality of life that was significant was perceived informal support, which was predictive of social quality of life.

Individuals' perceptions of support involve their subjective view of whether support is available, should they require it. Consistent with previous research (Renty & Roeyers, 2006), the current study found that the unique association between perceived informal support and social quality of life accounts for a significant amount of the total variance in social quality of life of adults with AST. This finding is intuitively sensible. Although perceived informal support was significantly correlated with life satisfaction and global quality of life, the unique associations between perceived informal support and these variables was not predictive in a comprehensive model. It seems the unique association between perceived informal support and quality of life operates primarily through the social domain.

This was the first study to investigate perceived formal support (e.g., health professionals, employment programs, etc.) and the association with quality of life in adults with AST. In contrast to perceived informal support, the results of the current study indicate that perceived access to formal supports is not an important predictor of quality of life in this population, nor is it correlated with any of the quality of life domains. It may be that formal supports are not salient to an individual's quality of life unless such support is required; whereas, informal support is more relevant to an individual's day to day functioning (e.g., emotional and social support; Kamio et al., 2013). Regardless, it appears as though perceptions of access to formal supports are not uniquely associated with the quality of life of adults with AST.

Turning to received support, neither formal nor informal received support were predictive of quality of life in the current study. This is consistent with the findings of Renty & Roeyers (2006) and Kamio and colleagues (2013). Interestingly, Kamio and colleagues (2013) found that received maternal support quality predicted quality of life. Although the findings of the current study suggest that amount of received formal and informal support is not uniquely associated with quality of life, other received support characteristics (i.e., quality of support provided, supports from specific individuals) may be related to the quality of life of adults with AST.

Taken together, these findings demonstrate the importance of understanding adults with AST's perceptions of their availability to access informal supports from their social support networks. These findings provide actionable information for bolstering the quality of life of adults with AST; affirmation and communication of informal supports from relevant sources may be beneficial to enhancing their quality of life. Future research should seek to investigate avenues for enhancing perceptions of informal support in this population.

Employment status. This was the first study to examine employment status as a predictor of quality of life in adults with AST. As adults with AST tend to be under- or unemployed and tend to struggle with financial resources (Lounds Taylor et al., 2015), being employed was expected to predict life satisfaction, and global, physical and environmental quality of life. Indeed, employment status was shown to be positively correlated with higher life satisfaction, global and physical quality of life. However, within a comprehensive model, employment status only demonstrated a predictive relationship with life satisfaction. Although not supportive of all the hypothesized relationships, the current study provides encouragement for continued employment supports for this population. Following previous mixed-samples research (Mason et al., 2018; Carr, 2010) and because of the potential of earned income to influence one's physical health and environment (Garcia-Villamisar, Wehman, & Navarro, 2002; Carr, 2010) it was hypothesized that being employed would also be uniquely associated with higher global, physical and environmental quality of life; however, the results of the current study do not support this. Several factors may be responsible for the absence of a predictive relationship for these domains.

First, a measure of financial resources was not included in the present study. Financial resources may influence the impact of employment status on physical and environmental quality of life, should the individual have access to funding through alternative sources. Secondly, the current study measured employment status as a dichotomy between employed versus unemployed. Future research could examine types of employment (e.g., part-time; full-time; work from home etc.) separately as predictors of quality of life. Another important employment factor which may be related to quality of life is one's satisfaction with employment. Similar to leisure satisfaction, if adults with AST are feeling satisfied and fulfilled by their employment this may predict their quality of life (Lorenz et al., 2016).

Leisure engagement and satisfaction. Leisure engagement and satisfaction were novel predictors of quality of life examined in the current study. It was hypothesized that both leisure engagement and leisure satisfaction would be uniquely associated with quality of life across all domains. In line with expectations, both leisure engagement and leisure satisfaction demonstrated significant positive correlations with all measures of quality of life. In contrast, the unique variance accounted for by leisure engagement did not predict any of the quality of life domains, while the unique variance accounted for by leisure satisfaction predicted both the psychological and social domains.

The finding of the current study that leisure engagement did not predict quality of life is in contrast to previous research demonstrating the ability of a leisure-based intervention to increase the quality of life of adults with AST (Hesselmark, Plenty & Bejerot, 2014). One explanation for the non-significant findings may be the way in which leisure engagement was measured. The current study utilized a diversity metric of the frequency of leisure engagement across six predefined leisure categories. It may be that this diversity component was not reflective of how adults with AST choose to spend their leisure time (i.e., they may spend a large amount of time in a single special interest activity; Caldwell-Harris & Jordan, 2012; Grove et al., 2018). However,, participants identified engaging in a variety of leisure categories and demonstrated a broad range of diversity scores on the leisure engagement variable. This suggests that other factors may be responsible for the non-significant findings.

Another factor which may be responsible for the non-significant findings for leisure engagement is the quality of one’s leisure, defined here as leisure satisfaction. Leisure satisfaction is defined as the extent to which an individual enjoys and is satisfied with their participation in leisure activities (Kuykendall et al., 2015). The results of the current study lend support to the importance of accounting for one's satisfaction with their chosen leisure pursuit. Leisure satisfaction has not been previously investigated as a predictor of quality of life in adults with AST; therefore, the results of the current study are the first to demonstrate how one's satisfaction with leisure engagement can predict higher psychological and social quality of life in this population. It is intuitive that feeling fulfilled in one's leisure pursuits is associated with higher psychological and social quality of life as leisure is often a time for individuals to cope with stress and form social connections, especially in adulthood (Newman et al., 2014). This is a key finding in the study of quality of life of adults with AST as it not only provides a novel and modifiable factor in promoting quality of life, but also highlights the importance of valuing the self-perceptions of adults with AST.

Mediation Model

The current study's third research question was designed to investigate the presence of complex relationships in the prediction of quality of life. Following this, leisure satisfaction was examined as a mediator in the relationship between leisure engagement and quality of life. Although leisure engagement and leisure satisfaction correlated with all six criterion variables, the unique association between leisure satisfaction and quality of life was significantly predictive only for the domains of psychological and social quality of life; therefore, the following discussion will focus on the mediating relationships for these two quality of life domains. The mediating relationship between leisure engagement, leisure satisfaction, and psychological and social quality of life has been previously demonstrated in the general population

(Kyukendall et al., 2015) and is logically applicable to adults with AST given extant research showing direct relationships between leisure engagement and quality of life (Billsteadt, Gillberg & Gillberg, 2011; Bishop-Fitzpatrick et al., 2017; Grove et al., 2018), leisure engagement and leisure satisfaction (Palmen et al., 2011), and leisure satisfaction and factors related to quality of life domains (i.e. improved mental health; Stacey et al., 2018). The findings of the current study tie together previous research to demonstrate a cohesive picture of the relationship between leisure and quality of life of adults with AST.

This is an important finding for adults with AST as their leisure participation is often viewed differently than that of the general population (Caldwell-Harris & Jordan, 2012; Jordan & Caldwell-Harris, 2014). Traditionally, special interests have been viewed as problematic behaviours that should be targets of intervention rather than beneficial behaviours for enhancing quality of life (Mercier et al., 2000). Although in certain circumstances special interests may become detrimental due to their intensity, current conceptualizations view them from a strength-based perspective (Jordan & Caldwell-Harris, 2014; Koenig & Williams, 2017). Accordingly, the current study did not separate special interests from more traditional leisure activity and, indeed, found a significant positive correlation between leisure engagement and quality of life. The current study further demonstrated that it is an individual's satisfaction with their leisure activities that is more closely related to a higher psychological and social quality of life. Therefore, if an adult with AST experiences high satisfaction in their given leisure pursuits, these pursuits should be fostered regardless of the specific nature, intensity or frequency of engagement. In sum, it appears as though the important consideration in the link between quality of life and leisure of adults with AST is their satisfaction with those leisure pursuits. This has important implications for understanding and supporting leisure in this population, including the provision and structuring of interventions around leisure.

Integrative Perspectives on Quality of Life

One of the primary goals of the current study was to identify predictors related to increased quality of life of adults with AST. Positively, and as expected, all six criterion variables were predicted in the current study. Life satisfaction and global quality of life were both included to reflect adults with AST's perception of their overall quality of life and it was expected that both would be predicted by the model. This was supported in the current study by showing that the model accounted for a significant portion of their variance. Not only were life satisfaction and global quality of life predicted by individual and contextual factors employed by the current study, so were the domains of psychological, physical, social and environmental quality of life.

Although all of the hypothesized predictors were not found to be uniquely associated with quality of life in the current study, the majority were found to be significantly correlated with each of the hypothesized domains. This is an important finding of the current study and helps to provide clarity to disjointed previous research, which typically investigated predictor variables in isolation or in small groups. The current study serves to clarify the nature of these previous relationships and elucidates which factors are unique predictors of quality of life of adults with AST. Positively, the current study found unique predictive relationships for each of the six domains of quality of life and demonstrates the importance of sense of coherence, leisure satisfaction, perceived informal support, adaptive skills, level of ASD traits, employment status and biological sex in the quality of life of adults with AST.

Global quality of life and life satisfaction have typically been conceptualized largely interchangeably in previous research on adults with AST and thus it was expected that they would be predicted by the same set of predictor variables. However, despite both constructs reflecting overall quality of life, they each demonstrated a unique set of predictor variables. Life satisfaction was predicted by biological sex, employment status, and sense of coherence. Global quality of life was predicted by level of ASD traits and sense of coherence. The differences between unique predictors of global quality of life versus life satisfaction are important to understand given the tendency of previous researchers to use measures of life satisfaction, well-being, and quality of life interchangeably (Chiang & Wineman, 2014; Kamp-Becker et al., 2010; Renty & Roeyers, 2006). In the current study, life satisfaction was measured using five items assessing current and retrospective life satisfaction (e.g., “I am satisfied with my life”; “If I could live my life over, I would change almost nothing”). Global quality of life was measured using a single item “How would you rate your quality of life” after a preamble focusing their attention on their experiences over the previous two week period. At face value, these measures appear to reflect similar constructs; however, previous research (Kahneman & Deaton, 2010; Maddux, 2018) suggests that when asked to reflect on their recent experiences, individuals tend to focus more on day to day and affective characteristics of quality of life (e.g., the impact of ASD traits on daily tasks); whereas, when asked to reflect more generally, they consider broader aspects of their life’s circumstances (e.g., employment status; sex). Although each of these are important when evaluating overall quality of life, it is retrospectively unsurprising that they are associated with a unique set of factors. For example, employment status appears to be predictive of one's perception of their broader life satisfaction. Barring a recent change in employment, employment status would be more salient to one's broad view of life satisfaction whereas other related factors, such as employment satisfaction may be more relevant to their day-to-day quality of life. The findings of the current study suggest that it is important to consider both one's perspective on day-to-day quality of life as well as how one views quality of life as a whole.

Turning to the domains of quality of life, the psychological domain was uniquely associated with sense of coherence and leisure satisfaction. Sense of coherence has been recognized in general population adults as a vital determinant of mental health outcomes (Eriksson & Lindstrom, 2007); therefore, adults with AST who possess a strong sense of coherence may be likely to exhibit enhanced resilience against psychological distress and display the higher psychological quality of life observed in the current study. Furthermore, leisure satisfaction has been positively associated with psychological well-being in general population adults and with lower levels of anxiety and depression in adults with AST (Kuykendall et al., 2015; Stacey et al., 2018). This suggests that engaging in satisfying leisure activities may serve as a buffer against psychological distress, fostering the observed higher psychological quality of life of adults with AST. Physical quality of life was uniquely associated with sense of coherence. This is consistent with previous research suggesting that individuals with a strong sense of coherence are better equipped to manage stress effectively, thus enhancing their overall physical health (Erikson & Lindstrom, 2007). Additionally, adults with AST with a high sense of coherence are likely to employ more adaptive coping strategies, which could lead to healthier lifestyle choices, consequently impacting physical health positively and increasing their physical quality of life (Erikson & Lindstrom, 2007). Social quality of life was uniquely associated with four factors: sense of coherence, being biologically female, perceived informal support, and leisure satisfaction. Individuals with a higher sense of coherence may find social interactions more meaningful and may be better able to manage social stressors (Eriksson & Lindstrom, 2007) which may explain the higher social quality of life observed in the current study. In terms of biological sex, recent research indicates that females often demonstrate more advanced social cognition and communication skills, which could lead to more fulfilling social interactions and improved social quality of life (Lai et al., 2011). Intuitively, perceived informal support can contribute to an individual's social well-being and satisfaction through feeling connected to one's social network, thereby enhancing their social quality of life (Renty & Roeyers, 2006). Finally, the positive relationship between leisure satisfaction and social quality of life aligns with the social component of one's leisure engagement. That is, individuals with high leisure satisfaction are likely to be satisfied with the quality of social interaction they receive from their leisure pursuits, thereby explaining the higher social quality of life observed in the current study (Kyukendall et al., 2015). Finally, the environmental domain was uniquely associated with sense of coherence and adaptive skills. Sense of coherence, as previously discussed, can facilitate a person's adaptability to their environment and thereby would be expected to increase their environmental quality of life (Eriksson & Lindstrom, 2007). Adaptive skills are crucial in navigating one's environment effectively (Kamp-Becker et al., 2010), individuals with the skills to manage environmental demands would therefore be expected to experience the higher environmental quality of life demonstrated in the current study.

Implications

The current study, guided by its three primary goals and three research questions, examined the quality of life of a large and robust sample of adults with AST. Prior to the current study, only a handful of predictors had received any replication and were either non-malleable, related to reduced quality of life, or not found to be significantly related to quality of life (e.g., cognitive functioning, maladaptive behaviour). Although various modifiable factors had begun to receive attention (e.g., adaptive behavior; social support; leisure), no predictors have been evaluated in more than a handful of studies or in the context of a comprehensive model. Previous predictors were largely studied in isolation or in small groups using small samples, thus limiting the ability to draw strong, representative conclusions about quality of life. Considerably less was known about biological females, individuals who were diagnosed later in life or who were self-diagnosed, or individuals who are living independently in the community. The findings of the current study addressed these limitations by identifying seven factors uniquely associated with the various domains of quality of life of adults with AST: sense of coherence, leisure satisfaction, biological sex, adaptive skills, level of ASD traits, employment status, and perceived informal support. Through differing combinations of these factors, all domains of quality of life were significantly predicted. Further, the results of the current study highlighted six modifiable predictors, including the contributions of two novel predictors (i.e., sense of coherence, leisure satisfaction), important to the quality of life of adults with AST. In addition, the current study was the first to examine complex relationships between predictors, adding to our understanding of quality of life in this population and laying a pathway to direct future research into the quality of life of adults with AST.

Following the third goal of the current study, the findings present opportunities to design and implement interventions to enhance the quality of life of this population. Leisure satisfaction, as a novel and modifiable predictor, presents an ideal candidate for intervention to enhance the quality of life of adults with AST. Leisure-based interventions have previously been shown to promote the quality of life of autistic adults (Hesselmark, Plenty & Bejerot, 2014) and increasing leisure engagement is linked to increases in leisure satisfaction (Palmen et al., 2011). The findings of the current study will help inform intervention efforts by highlighting the critical role of leisure satisfaction in relation to the quality of life of adults with AST. Understanding that satisfaction with leisure is the key component will guide future research to design their leisure-based interventions with the goal of promoting satisfaction. However, specific strategies for improving leisure satisfaction are not well understood in the extant literature, especially for adults with AST. Although research into leisure satisfaction in adults with AST is limited, the current findings present a rationale for developing methods to directly target individuals' experience of their leisure activities. Including adults with AST in the programming and direction of leisure-based interventions and supports may be one such method, as the findings of the current study suggest that it is self-perceived satisfaction that is paramount in predicting quality of life through leisure. Adults with AST should be regularly consulted to ensure their continued satisfaction in their leisure engagement. In contrast to previous leisure-based interventions that supported individuals' participation in predetermined leisure activities, including adults with AST throughout the process may help promote satisfaction both directly (i.e., through on-going consultation and monitoring) and indirectly (i.e., by promoting a sense of autonomy and control of their leisure pursuits), and therefore, may lead to the greatest benefits to leisure satisfaction and thereby quality of life (Newman et al., 2014).

Sense of coherence similarly presents as an excellent candidate for interventions designed to enhance the quality of life of adults with AST. Sense of coherence not only predicted each domain of quality of life, it was also the strongest unique predictor for five of the six criterion variables. Because sense of coherence is a modifiable predictor, interventions targeting this construct may be ideal for increasing the quality of life of adults with AST. Interventions have been shown to promote increased sense of coherence amongst various medical, disability, and mental health populations (Davidson et al., 2012; Mayer & Boness, 2011; Yamazaki et al., 2012). Individuals with these chronic conditions, similar to those with ASD, often feel closed off and isolated limiting their ability to see a positive pathway forward (Moons & Norekval, 2006; Yamazaki et al., 2012). The finding of the current study support the adaptations of these intervention for use in adults with AST. Interventions to increase sense of coherence that are most relevant to adults with AST may include education on ASD and how it may affect future functioning; identification of internal and external support resources and how to use them; help viewing their diagnosis as bringing meaning to their lives; and goal setting and goal management training (Moons & Norekval, 2006; Yamazaki et al., 2012). These interventions have not only been demonstrated to be effective at promoting sense of coherence in populations with chronic health conditions but are also in line with the findings of the current study and extant research on adults with AST (e.g., the importance of perceptions of support, the shift to a strength-based view of autistic traits and special interests). Environmental modifications and adaptations may also prove to be effective at promoting sense of coherence in adults with AST. For example, changes to employment conditions (e.g., work from home; project-based versus time-based compensation) or communal spaces (e.g., reduced overhead lighting and scents in grocery stores) may lead to greater feelings of confidence and manageability in the day to day lives of adults with AST. The identification of sense of coherence adds considerably to the literature, not only in its breadth and strength of prediction, but also by providing several specific possible avenues for increasing quality of life that have yet to be explored.

Another candidate for intervention is perceived informal support. Perceived informal support was the strongest unique predictor of social quality of life and was the only support variable to show significance in the current study. The findings of the current study highlight the need to target this variable through direct intervention. Previous research suggests that cognitive modification may be an avenue for increasing perceived informal support (Ma et al., 2019). In addition, the findings of the current study showed a strong correlation between perceived and received informal support in adults with AST; therefore, this suggests that interventions aimed at increasing informal support generally may improve perception of support as well. Interventions that may enhance perceived informal support include improving current relationships (e.g., family systems and couples' therapy), forming new support relationships (e.g., social and support groups, networking events), or targeting perceptions of support directly (e.g., cognitive therapy; Parker & Mosley, 2021; Tobin et al., 2014).

The finding that employment status predicted life satisfaction provides another avenue for improving the quality of life of adults with AST. Although under- and unemployment has been a long-identified issue in adults with AST, various interventions have been effective at promoting employment success in this population (Taylor et al., 2012; Westbrook et al., 2012). Given the nature of employment difficulties in adults with AST, interventions should not only focus on supported employment for unemployed individuals, but also on supports and resources that can help adults with AST find employment commensurate with their level of education and training. The findings of the current study lend support to the continued and increased use of employment interventions to support the employment needs of adults with AST.

Adaptive skills present another pathway for quality of life intervention through its prediction of the environmental domain. Existing research has shown the importance of targeting adaptive skills in adults with AST given the characteristic challenges that they typically face in performing tasks of daily living (Chiang & Wineman, 2014; Kamp-Becker et al., 2010). Interventions (e.g., video modeling, visual cues, self-recording and self-reinforcement, self-prompting) aimed at increasing adaptive skills have been shown to be effective (Palmen et al., 2011; Schmidt et al., 2019); however, they have typically been studied in populations with lower adaptive functioning. An important finding of the current study is that the relationship between adaptive skills and quality of life previously identified remains valid even for individuals whose level of adaptive skills is already quite proficient. The findings of the current study suggest that, even after individuals are able to take care of their basic needs (e.g., personal grooming, food preparation), advanced skill teaching (e.g., financial planning, household management) may further enhance their quality of life. These findings help inform the development of interventions for adults with AST aimed at improved these advanced adaptive skills given their relationship to quality of life.

The final, and unexpected, modifiable predictor of quality of life identified in the current study was level of ASD traits. Level of ASD traits was shown to be a unique predictor of global quality of life which suggests that, in contrast to previous research, difficulty with social communication and engagement in restricted repetitive behaviours is related to an individual's global quality of life. In the past, researchers have tried to target skill deficits directly, through behavioural intervention. This approach has been rejected by the autistic community (Sandoval-Norton et al., 2021). The autistic community values their social communication and behavioural differences and views them as central to their autistic identity (i.e., from a strength-based perspective). Therefore, the findings of the current study highlight the need to accommodate these differences in the context of autistic culture. That is, future interventions should be tailored to support and accommodate for these characteristic challenges (e.g., helping employers to understand and accept communication differences; augmentative and alternative communication; supported employment), thereby supporting quality of life without posing a threat to autistic identity.

Another important finding of the current study, which has implications for the provision and implementation of interventions designed to enhance the quality of life of adults with AST, was the low level of received formal supports accessed by this population. This is consistent with previous research and suggests that even if formal supports are available, they may not be immediately accessed by those who would benefit from them (Kamio et al., 2013; Renty & Roeyers, 2006). In the current study, 43% of the sample accessed mental health services, 15% accessed post-secondary supports, and under 10% accessed life skills training, social skills programs, recreation programs or employment programs. In addition, 'don't know' was the most commonly selected response to whether adults with AST perceived they had access to life skills training, social skills programs, recreation programs or employment programs. This highlights lack of knowledge of available supports as a potential barrier to access to services; increased education and dissemination of available supports is needed to promote service use in this population. To adequately support the service needs of adults with AST, resources need to be directed to both the development of interventions for promoting increased quality of life and to ensuring that adults with AST are aware of these services, once developed.

The findings of the current study also reveal two themes important in understanding the quality of life of adults with AST. The first theme to emerge from the current study is the potential role social functioning plays in the quality of life of adults with AST. Converging findings from biological sex, level of ASD traits and perceived informal support suggest that higher social functioning, through higher social engagement, higher social-communication skills or higher levels of social support, is related to higher quality of life in this population. For example, biological sex and level of ASD traits may predict quality of life through their impacts on social functioning. Given the social communication deficits characteristics of adults with AST, the finding that lower levels of ASD traits (hence lower social communication deficits) predicted higher global quality of life implies the important role social functioning plays in the quality of life of adults with AST. Individuals with lower levels of ASD traits likely have greater social communication skills, which allows them to function better in social environments and, in turn, may lead to the observed benefits to quality of life. Similarly, biological females in the current study reported greater social quality of life and life satisfaction than males. This relationship may be a result of sex-linked differences in social functioning that are characteristic of adults with AST (Bargiela, et al., 2016; D'Entremont et al., 2014) and indeed female participants in the current study showed the expected correlates of higher social functioning (i.e., higher perceived and received informal support). In following, social functioning may be central to perceived informal support's ability to predict social quality of life. Intuitively, the development and maintenance of social networks may be facilitated through higher social functioning and those individuals who are able to cultivate these support networks may be likely to experience a higher quality of life through their perception of the availability of this support. This is consistent with previous research and implies that individuals with greater social abilities may experience greater quality of life (Kamio et al., 2013; Mason et al., 2018). Taken together, level of ASD traits and biological sex appear to be related to social functioning such that lower levels of ASD traits and being female may allow for better social functioning (e.g., through fostering stronger social support networks), which then, in turn, may be associated with a higher quality of life.

The second central theme to emerge from the current study involves the importance of considering the perspective of the individual when considering their quality of life. Bronfenbrenner's bioecological model was initially selected as a model for the current study due to it consistency with the WHO definition of quality of life in its emphasis on considering the broad influences of an individual and their environment on quality of life (WHO, 1997; Bronfenbrenner, 1994). Although the bioecological framework provided a useful way to conceptualize previous predictors, its inclusion, in relation to the findings of the current study helps to highlight this second central theme. That is, rather than following Bronfenbrenner's conceptualization of individual and contextual factors, the findings of the current study highlight the importance of the individual and their perspective on these factors as paramount to their quality of life. This is foremost highlighted in the mediating relationship between leisure satisfaction, leisure engagement and quality of life demonstrated in the current study. That is, it is the individual's perception of their leisure engagement (i.e., satisfaction) that is the critical element in predicting higher quality of life in adults with AST. This is in line with research on adults from the general population (Kyukendall et al., 2015; Newman et al., 2014) as well as recent research supporting the importance of perspective when considering the special interests and leisure activities of adults with AST (Grove et al., 2018; Stacey et al., 2018). The current study also demonstrated the importance of the perspective of the individual in the predictive relationship observed between perceived informal support and quality of life. The findings of the current study show that an individual's perceptions on the availability of support is of greater importance to their quality of life than the actual reception of support. Furthermore, sense of coherence, which was demonstrated to predict all domains of quality of life and life satisfaction, involves an individual's perception of the manageability, comprehensibility and meaningfulness of their contextual circumstances. Again, this demonstrates that how an individual perceives their life's circumstance is central to predicting their quality of life.

Finally, considering quality of life is reliant on one's own perceptions (WHO, 1997), adults with AST can still experience a high quality of life even if their circumstances do not conform to societal standards (Skevington et al., 2004; Skevington et al., 2009).

In line with these two themes, there has been an emergence of autistic culture and neurodivergence (i.e., valuing the diversity that comes from differences in neurological processing) in recent years. There has been a shift in the autistic adult community advocating for recognition of the importance of their neurodiversity and the influence it has on their perceptions of the world (Robertson, 2009; Grove et al., 2018; Milton & Simms, 2016). The findings of the current study reinforce the importance of this view in that the unique perspectives of adults with AST should be valued. Additionally, the growth of autistic culture has served to increase the social functioning of this group through the creation of autistic led spaces. Adults with AST report many barriers to feeling that they belong in traditional social spaces, which has been linked to a lower quality of life (Milton & Sims, 2016). Unsurprisingly, feelings of connection and recognition from others and positive accepting relationships, facilitated through autistic-led spaces, can increase their feelings of wellbeing and belonging (Milton & Sims, 2016; Walton & Waltz, 2019). Following these two themes, interventions developed in collaboration with adults with AST, and that incorporate ongoing consultation to ensure better subjective outcomes (e.g., satisfaction) and social functioning may be the most beneficial avenues for increasing their quality of life.

Limitations

One key limitation was the correlational nature of the research. The current study is able to demonstrate the unique associations between predictor variables and quality of life and life satisfaction; however, the findings do not imply causation. That is, a change in a predictor variable cannot be said to cause an increase or decrease in the quality of life of adults with AST. In addition, several of the predictor variables showed moderate correlations which may have contributed to the obfuscation of individual variable effects in the regression models. There were also several sampling limitations of the current study that should be mentioned. First, the current study did not confirm a diagnosis of ASD. To ensure that the sample was comprised of adults with AST, only participants who self-identified as autistic and scored 32 or higher on the Autism Quotient (AQ) were retained. This cut-off score has been found to be highly predictive of an ASD diagnosis and is correlated with other diagnostic measures (Baghdadli et al., 2017; Baron-Cohen et al., 2006). Many adults with ASD are either not diagnosed until adulthood, or remain undiagnosed as adults (APA, 2013; Brugha et al., 2016); therefore, excluding individuals who have not received a formal diagnosis would not be representative of this population. The current study chose to include both formally- and self-diagnosed adults with AST to capture a broader sample of adults with AST. In addition, participants who were formally diagnosed versus self-diagnosed did not differ significantly in terms of their scores on the Autism Quotient (AQ) or their scores on any of the dependent variables. Secondly, it was not possible to examine the cognitive level of the adults in the current study. Rather, it was assumed that individuals who are able to navigate to a website and independently complete an online survey would not have an intellectual disability. Hence, the current sample was referred to as adults with high autistic traits and average cognitive functioning (AST). Thirdly, data collection was halted prematurely due to the COVID-19 pandemic. This resulted in a reduced sample size which may have limited the study's power and increased the risk of Type II error.

Measurement limitations include the development of measures that were created specifically for the current study and whose psychometric properties were not evaluated before their use (i.e., leisure engagement, levels of support). The leisure engagement measure was developed to examine leisure engagement through a diversity metric which may have limited its ability to capture the leisure engagement of all participants (e.g., those that engage in one or two interests for a majority of their leisure time). Diversity has been shown to be a stronger predictor of quality of life than time or frequency of activities in the general population (Kuykendall et al., 2015). Additionally, diversity was selected as the metric for the current study due to previous research indicating that extremely intense interests (e.g., spending all leisure time engaged in a single activity) can have negative implications for the quality of life of adults with ASD (Grove et al., 2018). In addition, of the previously available measures, not all were validated for adults with AST. Measures with adequate to good psychometric properties were utilized when possible. Unfortunately, the adaptive skills measure had a ceiling effect while the measures of co-occurring mental health disorders and employment status used dichotomous responses. Despite the ceiling effect for the adaptive skills measure, the scores still allowed for sufficient variability to detect significance in the predictive relationship with quality of life. Further, given the average cognitive functioning of the sample, this high level of adaptive skill would be expected. The selection of dichotomous measurements for the variables of employment and co-occurring mental health disorders limited the ability of the current study to evaluate the extent to which more subtle differences in these variables (e.g., employment hours per week, number of co-occurring disorders) may have impacted the results. Future research would benefit from the development and validation of measures with wider ranges. In terms of measures of quality of life, the current study used both the Satisfaction with Life Scale and the global domain question from the WHOQOL – BREF to measure overall quality of life. The fact that each were uniquely associated with different variables highlights the varied nature of this construct and suggests that future research should consider both day-to-day and retrospective reflections on quality of life. Finally, a specific measure of quality of life for adults with AST was not available at the time of data collection. The WHO (Power et al., 2010) developed a measure (WHOQOL-DIS) to assess additional factors related to the quality of life of adults with physical and intellectual disabilities. However, it was not validated on cognitively-able adults with ASD. Additional factors related to quality of life specific for autistic adults have been identified, including experiences of a positive autistic identity, other people's lack of understanding of autism, sensory issues, and the validation of autistic people's contributions to society (McConachie et al., 2020). The ASQoL (McConachie et al., 2017) is a measure specifically developed to assess these quality of life factors; however, thus far it has not demonstrated robust psychometric properties, especially in women (Williams & Gotham, 2021).

A final limitation is the absence of adults with AST in the research design, conduct, and analysis of the current study. While the study aims to explore the quality of life of adults with AST, their perspectives were not incorporated into the research process beyond their role as participants. This could potentially limit the depth and nuance of the findings, as the lived experiences and insights of these individuals were not utilized to shape the research questions or interpret the data. Future research would benefit from a more participatory approach, involving adults with AST in various stages of the study to capture a more comprehensive understanding of their quality of life.

Directions for Future Research

The amount of variance accounted for in each domain of quality of life suggests there are additional factors associated with quality of life that were not measured in the current study. In order to provide a broad overview of predictors of quality of life, the current study focused on a breadth of potentially relevant predictors. This was critical to highlight which predictors were predictive in a comprehensive model; however, it also provides directions for future research to examine identified predictors with more depth. In addition, the current study highlights the existence of complex relationships between variables as evidenced by the mediating relationship between leisure engagement and satisfaction; however, various other complex relationships may exist and should be investigated by future research.

The theme of social functioning identified in the current study lays out several pathways for future research to investigate. Firstly, it would be beneficial to examine how an individual's social functioning is related to their quality of life. Future research should examine different facets of social functioning and their relationship to quality of life. For example, is it social skills, social communication, social engagement, social networks or social satisfaction (i.e., how satisfied one is with their social life) that is paramount to quality of life. In following, it would also be interesting to examine complex relationships between each type of social functioning and other identified predictors and quality of life (e.g., level of ASD traits, biological sex). For example, biological sex may moderate the relationship between level of ASD traits and global quality of life. Females with AST often exhibit a different pattern of traits than males, and societal expectations and gender roles could impact the way ASD traits are associated with quality of life (Hull et al., 2017). Additionally, employment status could serve as a moderator of the relationship between level of ASD traits and quality of life. Employment can provide meaningful social interactions with similarly minded individuals, potentially minimizing the negative associations between level of ASD traits and quality of life (Orsmond et al., 2013). The current study highlighted the relationship between lower levels of ASD traits and higher quality of life; however, future research should examine what aspects of ASD traits (e.g., social-emotional reciprocity, nonverbal communication, maintenance of relationships) that is most important to quality of life. Furthermore, the current study also reflects the importance of perceived informal support for quality of life. It would be interesting to extend these findings by examining perceptions of support for specific types of social relationships. For example, adults with AST generally have difficulty making and maintaining friendships (Spaine & Blainey, 2015), but may have strong familial support. Examining whether having high perceived support in one relationship domain is sufficient to produce the observed benefits to quality of life or whether there are additive or interactive effects between relationship domains would be of benefit. In addition, relationship quality, which predicts quality of life in the general population (Gómez-López et al., 2019), may also be beneficial to examine as it relates to the quality of life of adults with AST. Finally, cultural and socio-economic factors could serve as potential moderating variables. For example, societal attitudes and accessibility of support services in different cultural or socio-economic contexts could influence how social functioning may be related to the quality of life of adults with AST.

Following the second theme, it would be interesting to more broadly consider the perspective of the individual for other variables not considered in the current study. For example, both employment status and biological sex were shown to be unique predictors of quality of life but did not have a subjective counterpart in the current study. Being female was associated with higher quality of life as measured through biological sex; however, gender was not examined due to a dearth of previous research adequately examining this complex and nuanced variable (Warrier et al., 2020). This distinction has received little attention in adults with AST; however, it may have important implications given the negative association between gender dysphoria and quality of life (Lindqvist et al., 2016) and the three to six times higher prevalence of gender dysphoria in ASD versus the general population (Warrier et al., 2020). Indeed, 23% of the current sample indicated a gender identity that differed from their biological sex (e.g., transgender, non-binary, agender) including four percent who identified as transgender. Future research would benefit from examining whether it is biological sex or identifying as female that is predictive of higher quality of life. Additionally, the current study highlights the importance of employment status as a unique predictor of life satisfaction. However, previous research has also demonstrated that employment is linked to increased stress and anxiety for adults with AST if they are not adequately supported and accommodated (e.g., sensory sensitivities, communication differences; Chen et al., 2014). Therefore, by solely examining employment status, current research is missing a critical piece of the employment experiences of adults with AST. Examining employment satisfaction as a predictor of quality of life in adults with AST would provide invaluable information on the employment experiences of this population and elucidate how their perspective on their employment relates to quality of life. This link has been demonstrated in general population adults (Unamue et al., 2017), yet is poorly understood in adults with AST. Finally, future research would also benefit from the inclusion of qualitative methodologies in order to better understand the factors that adults with AST consider important to their quality of life. The selection of hypothesized predictors for the current study and those utilized in previous research have ultimately been guided by findings from general population adults. Given the importance of considering the perspective of adults with AST highlighted in the current findings, it is only fitting that future research consider the perspectives of these individuals in understanding which additional factors they may view as important to their quality of life. Future research which considers and values the perspectives of adults with AST will not only provide a deeper and more nuanced understanding of their quality of life, it will also validate the experiences of these individuals and align with the emergence of autistic culture in this community.

Conclusion

Quality of life is a multifaceted construct comprising psychological, social, physical, and environmental domains along with global quality of life and life satisfaction. Quality of life is an inherently meaningful and important outcome that should be a priority for all individuals, including adults with AST. Despite the importance of quality of life, there has been a paucity of research into the quality of life of adults with AST. The current study adds considerably to the existing literature by employing a large and robust sample of adults with AST, by including those who are formally and self-diagnosed, by examining a variety of previously identified and novel predictors, and by examining complex relationships, in a comprehensive model of quality of life. In line with existing research, the current study demonstrated that quality of life was lower for adults with AST than the general population across all domains of quality of life, thus highlighting the critical importance of studying quality of life in this population. The current study also identified seven factors (i.e., sense of coherence, biological sex, level of ASD traits, adaptive skills, leisure satisfaction, perceived informal support, employment status) which were uniquely associated with the quality of life of adults with AST, including the identification of two novel predictors and one complex relationship. More importantly, six of the seven identified predictors are modifiable and present candidates for the development and utilization of interventions intended to promote quality of life in this population.

When viewed in panorama, the pattern of findings in the current study revealed two central themes in the quality of life of adults with AST: the key role of social functioning and the importance of considering the perspective of the individual. Due to the defining characteristics of ASD, unique barriers to social functioning exist in this population that are not present for adults in the general population. Social functioning appears to underlie the relationship between several predictors and quality of life and, therefore, social functioning should be prioritized when considering the needs of this population. Following trends observed in the general population, the current study serves to elucidate the necessity of considering the subjective experiences of this population. Although the context of an individual's life is clearly important to consider (e.g., is one employed?; do they engage in leisure?), it is the perspective of the individual on that context that is paramount to their quality of life. Following these two central themes, effective provision of supports, services and interventions designed to improve the quality of life of adults with AST must value and prioritize the perspectives of these unique individuals, especially as it pertains to their social functioning. Critically, the current study advances our understanding of the quality of life of adults with AST by providing a comprehensive and descriptive model of quality of life including actionable steps that future research can harness to improve the lives of this understudied population.

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Appendix A – Recruitment Materials for Adults with ASD

<u>Social Media (e.g., Facebook, Twitter; note Twitter has a 280 character limit)</u>

Autistic Adults (21 years +) wanted for online survey of quality of life (20-30 min)
We would like to know all about your well-being and the factors which may influence it. All forms of autism are welcome. To find out more, click on the link. (URL)

Now recruiting for online study: Autistic adults' (21 years +) quality of life. Tell us about you and your well-being. (URL)

Autistic adults (21 years +) tell us about your life satisfaction and well-being
Online survey of quality of life. (URL)

<u>Recruitment Flyers</u>

Autistic Adults (21 years +) wanted for online survey of quality of life (20-30 min)

We are based at the University of New Brunswick in Fredericton, Canada. We are interested in your life satisfaction and well-being. To participate you must:

- Have autism (autism, Autism Spectrum Disorder, Asperger's, PDD-NOS)
- Be at least 21 years of age

For more information go to (URL) or contact the investigators at ASDQOL@unb.ca.

Visiting the website does not obligate you to participate.

This study is being conducted by Sebastian Pacey-Smith, Ph.D. Student and Dr. Barbara D'Entremont, Ph.D., L.Psyc, Professor from the University of New Brunswick. For more information please contact either investigator at ASDQOL@unb.ca.

[pull off tabs with the website URL will follow for hard copy fliers intended to be posted on physical bulletin boards]

Email for organizations

Dear [insert name]

We are seeking help recruiting autistic adults for an online survey of quality of life. We are interested in the experiences of autistic adults (21 years+). We know very little about autistic adults' quality of life and the factors which may influence it. We are hoping to address this gap in knowledge.

We would appreciate it if you could share the information below with anyone you think meets the criteria for the study. Please feel free to share the information in any way you feel is best for your organization (e.g., e-mail, newsletters, bulletin boards, etc.). For your convenience, I have also attached a pdf poster that can be printed. If you would like hard copies or if you have any questions about the study, please do not hesitate to contact the principal investigator Sebastian Pacey-Smith at ASDQOL@unb.ca. This project is on file with the Research Ethics Board, University of New Brunswick (REB # insert #).

Sincerely,
Sebastian Pacey-Smith

***the following can be cut/paste into an email or other electronic communication ***

Autistic Adults (21 years +) wanted for online survey of quality of life (20-30 min)
Researchers at the University of New Brunswick in Fredericton, Canada are interested in learning about your quality of life and the factors which may influence it. To participate you must have autism (autism, Asperger's, PDD-NOS), and be at least 21 years of age. For more information go to (URL) or contact the investigator at ASDQOL@unb.ca. Visiting the website does not obligate you to participate. This study is being conducted by Sebastian Pacey-Smith and Dr. Barbara D'Entremont. This project is on file with the Research Ethics Board, University of New Brunswick (REB # insert #).

Email for request to post online

Dear [name],

We are seeking help recruiting autistic adults for an online survey of quality of life. We are interested in the experiences of autistic adults (21 years+). We know very little about autistic adults' quality of life and the factors which influence it. We are hoping to address this gap in knowledge.

We would like to have our study posted on your website, if possible. If you would have any questions about the study, please do not hesitate to contact the principal investigator Sebastian Pacey-Smith at ASDQOL@unb.ca. This project is on file with the Research Ethics Board, University of New Brunswick (REB # insert #).

Sincerely,

Sebastian Pacey-Smith

***the following can be cut/paste into an email or other electronic communication ***

Autistic Adults (21 years +) wanted for online survey of quality of life (20-30 min)
Researchers at the University of New Brunswick in Fredericton, Canada are interested in your quality of life and the factors which influence it. To participate you must have autism (autism, Asperger's, PDD-NOS), and be at least 21 years of age. For more information go to (URL) or contact the investigator at ASDQOL@unb.ca. Visiting the website does not obligate you to participate. This study is being conducted by Sebastian Pacey-Smith and Dr. Barbara D'Entremont. This project is on file with the Research Ethics Board, University of New Brunswick (REB # insert #).

Reddit

Autistic Adults (21 years +) wanted for online survey of quality of life (20-30 min)

We know almost nothing about autistic adults' quality of life and the factors which influence it Help us change that by completing our survey. All forms of autism welcome. To find out more, click on the link.

(URL)

Contact the moderator with the following text:

Hello, my name is Sebastian Pacey-Smith. I am a student at the University of New Brunswick, Fredericton. My supervisor and I are conducting a study on quality of life of autistic adults. We know almost nothing about autistic adults' quality of life and the factors which influence it. I was wondering if you would share information about our study on your Facebook page. I am attaching a poster and the link is (URL) but can send you more information if required. We can be contacted at ASDQOL@unb.ca

Appendix B - Consent Form

Project Title: Online Research for Autistic Adults: Quality of Life Study
Principal Investigator: Sebastian Pacey-Smith (PhD Student)
Supervisor: Dr. Barbara D'Entremont, Ph.D., L. Psyc.
Address: Psychology Department, University of New Brunswick
Tel: 458-7692
Email: ASDQOL@unb.ca

What is it about?
We are conducting a study on the quality of life of adults with Autism Spectrum Disorder (ASD). We invite you to participate in this study.

Who can participate?
We are seeking to recruit autistic adults with a previous diagnosis of an Autism Spectrum Disorder. We are interested in the experiences of autistic adults who are at least 21 years of age.

Who is doing it?
The study is being done by Sebastian Pacey-Smith, a PhD Student in the Department of Psychology at the University of New Brunswick under the supervision of Barbara D'Entremont, PhD, a professor in the Department of Psychology at the University of New Brunswick.

What will I have to do?
If you choose to participate, you will complete an online questionnaire. The survey takes most people approximately 20-30 minutes to complete all of the questions. You will be asked to complete background questions and questions about your autistic traits, mental health, self-confidence, sense of purpose, employment, support, leisure, and quality of life.

What will I get for participating?
You may choose to enter a draw for a 1/20 chance to win a $50.00 CAD Visa gift card after completing the survey. To be entered in the draw, you must progress to the end of the survey and click "submit". This will direct you to a page where you can leave contact information for sending the money. If you exit the survey without submitting your responses, you will not be entered in the draw. Your answers will provide important information for helping professionals to better understand the quality of life of adults with ASD.

How will my answers be kept confidential and private?
This study will not collect any personal information such as your name or address. Your name and email will be collected to receive a copy of the results and if you would like to be entered into the draw; however, this will be stored separately from the data and not linkable to your answers to any questions. All information will be kept strictly

confidential. The data are stored on a secure server on the University of New Brunswick website. The server is protected by a firewall. Data will be stored on password-protected computers that only the researchers have access to.

What are my rights as a participant in the survey?
Participation is **completely voluntary**. You may choose not to answer a specific item and continue with the questionnaires. The link to submit your name for the draw will only be presented after you have submitted your data. You may also choose not to continue the study for any reason at any time by closing your browser. **Your data can only be used by the researchers after you click the submit button at the end of the survey.**

Why might I not want to do it?
We do not expect that you will feel uncomfortable during the study. However, sometimes people are upset by answering questions about themselves. In order to provide you with more information we have provided resources about ASD and quality of life at the end of the survey.

Who can I contact for more information?
If you have questions at any time, please contact Sebastian Pacey-Smith or Dr. D'Entremont at ASDQOL@unb.ca

This project is on file with the Research Ethics Board at the University of New Brunswick (REB#). If you have questions or concerns about your rights or treatment as a participant please contact the Chair of the UNB Department of Psychology Ethics Board, Biljana Stevanovski bstevano.unb@gmail.com

YES___NO___ I have a diagnosis of an Autism Spectrum Disorder (Autism, Aspergers etc.)
YES___NO___ I am at least 21 years of age.
YES___NO___ I have read the above statements and **AGREE** to participate in this research.

SUBMIT BUTTON

Appendix C - Debriefing Form

It is important to understand the quality of life of adults with autism. We know that adults with autism tend to have a lower quality of life than their peers. We also know there are some things that are associated with higher quality of life for autistic adults.

Although we know some of the things that are related to quality of life (e.g., adaptive skills, support), we do not know which are the most important and how they relate to each other. Your participation in this study will help us better understand how symptoms of ASD, mental health, self-confidence, sense of purpose, employment, support, and leisure effect quality of life. We hope that this research will provide new directions and ideas for helping to improve quality of life for adults with autism.

We would like to thank you for participating in this research study and helping us to understand quality of life of adults with autism.

A summary of the results of this study will be sent directly to you as soon as the study is completed and the results are prepared if you choose to leave your contact information at the end of the survey.

If you would like to be entered into a draw for 1/20 chance of winning a $50.00 Visa gift card, please click the following link (URL). Your email address will not be linked to the data collected for the study.

References:

- https://www.autism-society.org/about-the-autism-society/guiding-principles/quality-of-life-outcomes/
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Appendix D - Questionnaire

Demographic Questions

Tell us a little about yourself……..

What country do you live in?

Drop down menu

Which best describes your race/ethnicity?

Aboriginal/Metis/Inuit/Native American/American Indian
African-American/Black
Arab
Caucasian/White/European
Chinese
Filipino
Hispanic/Latino/Latina
Japanese
Korean
Latin American
Bi-racial/Multi-racial
South Asian (e.g., East Indian, Pakistani, Sri Lankan)
Southeast Asian (e.g., Vietnamese, Cambodian, Malaysian, Laotian)
West Asian (e.g., Iranian, Afghan)
Other (please specify)

What is your first language?

Which option best describes your fluency in English?

Basic
Conversational
Fluent

Which option best describes the area in which you live

Rural
Urban

Which option best describes your living situation

Living independently
Living independently with support
Living in a supported community
Living in an institution
Other

How old are you?

Which sex do you identify with?

- Male
- Female
- Other (specify)

Which option best describes your Autism diagnosis?

- Autism Spectrum Disorder, Autism, or Autistic Disorder
- Asperger's Disorder
- Pervasive Developmental Disorder
- High functioning autism
- Not sure but definitely on the spectrum
- Other (please describe)

Who diagnosed you?

- Psychologist
- Neurologist
- Psychiatrist
- Physician
- Self-diagnosis
- Family Member
- Don't know
- Other (specify)

What age were you diagnosed?

Do you have any physical conditions that affect your quality of life?

- Specify

What is the highest level of education that you completed?

- Less than high school
- High school
- College
- University-undergraduate
- University-graduate

Appendix E - WHOQOL - BREF

WHOQOL – BREF (WHO, 1998)

The following questions ask how you feel about your quality of life, health, or other areas of your life. I will read out each question to you, along with the response options. **Please choose the answer that appears most appropriate.** If you are unsure about which response to give to a question, the first response you think of is often the best one.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last four weeks.**

		Very poor	Poor	Neither poor nor good	Good	Very good
1.	How would you rate your quality of life?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

		Very poor	Poor	Neither poor nor good	Good	Very good
2.	How satisfied are you with your health?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

The following questions ask about how much you have experienced certain things in the last four weeks.

		Not at all	A little	A moderate amount	Very much	Extremely
3.	To what extent do you feel that physical pain prevents you from doing what you need to do?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
4.	How much do you need any medical treatment to function in your daily life?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
5.	How much do you enjoy life?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

6.	To what extent do you feel your life to be meaningful?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
7.	How well are you able to concentrate?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
8.	How safe do you feel in your daily life?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
9.	How healthy is your physical environment?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

The following questions ask about how completely you experience or were able to do certain things in the last four weeks.

		Not at all	A little	Moderately	Mostly	Completely
10.	Do you have enough energy for everyday life?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
11.	Are you able to accept your bodily appearance?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
12.	Have you enough money to meet your needs?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
13.	How available to you is the information that you need in your day-to-day life?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
14.	To what extent do you have the opportunity for leisure activities?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

		Very poor	Poor	Neither poor nor good	Good	Very good
15.	How well are you able to get around?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

		Very dissatisfied	Dissatisfied	Neither satisfied or dissatisfied	Satisfied	Very satisfied

16.	How satisfied are you with you sleep?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
17.	How satisfied are you with your ability to perform your daily living activities?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
18.	How satisfied are you with your capacity for work?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
19.	How satisfied are you with yourself?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
20.	How satisfied are you with your personal relationships?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
21.	How satisfied are you with your sex life?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
22.	How satisfied are you with the support you get from your friends?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
23.	How satisfied are you with the conditions of your living place?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
24.	How satisfied are you with your access to health services?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
25	How satisfied are you with your transport?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

The following question refers to how often you have felt or experienced certain things in the last four weeks.

		Never	Seldom	Quite often	Very often	Always
26.	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Appendix F - Level of Autistic Traits

The Adult Autism Spectrum Quotient
(AQ; Baron-Cohen, Wheelwright, Skinner, Martin & Clubley, 2001)

The Adult Autism Spectrum Quotient (AQ)

Ages 16+

SPECIMEN, FOR RESEARCH USE ONLY.

For full details, please see:
S. Baron-Cohen, S. Wheelwright, R. Skinner, J. Martin and E. Clubley, (2001)
The Autism Spectrum Quotient (AQ) : Evidence from Asperger Syndrome/High Functioning Autism, Males and Females, Scientists and Mathematicians
Journal of Autism and Developmental Disorders 31:5-17

How to fill out the questionnaire

Below are a list of statements. Please read each statement very carefully and rate how strongly you agree or disagree with it by circling your answer.

DO NOT MISS ANY STATEMENT OUT.

Examples

E1. I am willing to take risks.	definitely agree	slightly agree	slightly disagree	definitely disagree
E2. I like playing board games.	definitely agree	slightly agree	slightly disagree	definitely disagree
E3. I find learning to play musical instruments easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
E4. I am fascinated by other cultures.	definitely agree	slightly agree	slightly disagree	definitely disagree

1. I prefer to do things with others rather than on my own.	definitely agree	slightly agree	slightly disagree	definitely disagree
2. I prefer to do things the same way over and over again.	definitely agree	slightly agree	slightly disagree	definitely disagree
3. If I try to imagine something, I find it very easy to create a picture in my mind.	definitely agree	slightly agree	slightly disagree	definitely disagree
4. I frequently get so strongly absorbed in one thing that I lose sight of other things.	definitely agree	slightly agree	slightly disagree	definitely disagree
5. I often notice small sounds when others do not.	definitely agree	slightly agree	slightly disagree	definitely disagree
6. I usually notice car number plates or similar strings of information.	definitely agree	slightly agree	slightly disagree	definitely disagree
7. Other people frequently tell me that what I've said is impolite, even though I think it is polite.	definitely agree	slightly agree	slightly disagree	definitely disagree
8. When I'm reading a story, I can easily imagine what the characters might look like.	definitely agree	slightly agree	slightly disagree	definitely disagree
9. I am fascinated by dates.	definitely agree	slightly agree	slightly disagree	definitely disagree
10. In a social group, I can easily keep track of several different people's conversations.	definitely agree	slightly agree	slightly disagree	definitely disagree
11. I find social situations easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
12. I tend to notice details that others do not.	definitely agree	slightly agree	slightly disagree	definitely disagree
13. I would rather go to a library than a party.	definitely agree	slightly agree	slightly disagree	definitely disagree
14. I find making up stories easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
15. I find myself drawn more strongly to people than to things.	definitely agree	slightly agree	slightly disagree	definitely disagree
16. I tend to have very strong interests which I get upset about if I can't pursue.	definitely agree	slightly agree	slightly disagree	definitely disagree

17. I enjoy social chit-chat.	definitely agree / slightly agree / slightly disagree / definitely disagree
18. When I talk, it isn't always easy for others to get a word in edgeways.	definitely agree / slightly agree / slightly disagree / definitely disagree
19. I am fascinated by numbers.	definitely agree / slightly agree / slightly disagree / definitely disagree
20. When I'm reading a story, I find it difficult to work out the characters' intentions.	definitely agree / slightly agree / slightly disagree / definitely disagree
21. I don't particularly enjoy reading fiction.	definitely agree / slightly agree / slightly disagree / definitely disagree
22. I find it hard to make new friends.	definitely agree / slightly agree / slightly disagree / definitely disagree
23. I notice patterns in things all the time.	definitely agree / slightly agree / slightly disagree / definitely disagree
24. I would rather go to the theatre than a museum.	definitely agree / slightly agree / slightly disagree / definitely disagree
25. It does not upset me if my daily routine is disturbed.	definitely agree / slightly agree / slightly disagree / definitely disagree
26. I frequently find that I don't know how to keep a conversation going.	definitely agree / slightly agree / slightly disagree / definitely disagree
27. I find it easy to "read between the lines" when someone is talking to me.	definitely agree / slightly agree / slightly disagree / definitely disagree
28. I usually concentrate more on the whole picture, rather than the small details.	definitely agree / slightly agree / slightly disagree / definitely disagree
29. I am not very good at remembering phone numbers.	definitely agree / slightly agree / slightly disagree / definitely disagree
30. I don't usually notice small changes in a situation, or a person's appearance.	definitely agree / slightly agree / slightly disagree / definitely disagree
31. I know how to tell if someone listening to me is getting bored.	definitely agree / slightly agree / slightly disagree / definitely disagree
32. I find it easy to do more than one thing at once.	definitely agree / slightly agree / slightly disagree / definitely disagree

33. When I talk on the phone, I'm not sure when it's my turn to speak.	definitely agree / slightly agree / slightly disagree / definitely disagree
34. I enjoy doing things spontaneously.	definitely agree / slightly agree / slightly disagree / definitely disagree
35. I am often the last to understand the point of a joke.	definitely agree / slightly agree / slightly disagree / definitely disagree
36. I find it easy to work out what someone is thinking or feeling just by looking at their face.	definitely agree / slightly agree / slightly disagree / definitely disagree
37. If there is an interruption, I can switch back to what I was doing very quickly.	definitely agree / slightly agree / slightly disagree / definitely disagree
38. I am good at social chit-chat.	definitely agree / slightly agree / slightly disagree / definitely disagree
39. People often tell me that I keep going on and on about the same thing.	definitely agree / slightly agree / slightly disagree / definitely disagree
40. When I was young, I used to enjoy playing games involving pretending with other children.	definitely agree / slightly agree / slightly disagree / definitely disagree
41. I like to collect information about categories of things (e.g. types of car, types of bird, types of train, types of plant, etc.).	definitely agree / slightly agree / slightly disagree / definitely disagree
42. I find it difficult to imagine what it would be like to be someone else.	definitely agree / slightly agree / slightly disagree / definitely disagree
43. I like to plan any activities I participate in carefully.	definitely agree / slightly agree / slightly disagree / definitely disagree
44. I enjoy social occasions.	definitely agree / slightly agree / slightly disagree / definitely disagree
45. I find it difficult to work out people's intentions.	definitely agree / slightly agree / slightly disagree / definitely disagree
46. New situations make me anxious.	definitely agree / slightly agree / slightly disagree / definitely disagree
47. I enjoy meeting new people.	definitely agree / slightly agree / slightly disagree / definitely disagree

48. I am a good diplomat.	definitely agree	slightly agree	slightly disagree	definitely disagree
49. I am not very good at remembering people's date of birth.	definitely agree	slightly agree	slightly disagree	definitely disagree
50. I find it very easy to play games with children that involve pretending.	definitely agree	slightly agree	slightly disagree	definitely disagree

Appendix G - Self-Efficacy

General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995)

General Self-Efficacy Scale (GSE)

About: This scale is a self-report measure of self-efficacy.

Items: 10

Reliability:
Internal reliability for GSE = Cronbach's alphas between .76 and .90

Validity:
The General Self-Efficacy Scale is correlated to emotion, optimism, work satisfaction. Negative coefficients were found for depression, stress, health complaints, burnout, and anxiety.

	Not at all true	Hardly true	Moderately true	Exactly true
1. I can always manage to solve difficult problems if I try hard enough	◻	◻	◻	◻
2. If someone opposes me, I can find the means and ways to get what I want.	◻	◻	◻	◻
3. It is easy for me to stick to my aims and accomplish my goals.	◻	◻	◻	◻
4. I am confident that I could deal efficiently with unexpected events.	◻	◻	◻	◻
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.	◻	◻	◻	◻
6. I can solve most problems if I invest the necessary effort.	◻	◻	◻	◻
7. I can remain calm when facing difficulties because I can rely on my coping abilities.	◻	◻	◻	◻

8. When I am confronted with a problem, I can usually find several solutions.	□	□	□	□
9. If I am in trouble, I can usually think of a solution	□	□	□	□
10. I can usually handle whatever comes my way.	□	□	□	□

Scoring:

	Not at all true	Hardly true	Moderately true	Exactly true
All questions	1	2	3	4

The total score is calculated by finding the sum of the all items. For the GSE, the total score ranges between 10 and 40, with a higher score indicating more self-efficacy.

Appendix H - Sense of Coherence

Sense of Coherence Scale (SOC-13)
(Schwarzer & Jerusalem, 1995)
Sense of Coherence Scale

1 Do you have the feeling that you don't really care about what goes on around you?

1	2	3	4	5	6	7
Very seldom or never						Very often

2 Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well?

1	2	3	4	5	6	7
Never Happened						Always Happened

3 Has it happened that people whom you counted on disappointed you?

1	2	3	4	5	6	7
Never Happened						Always Happened

4 Until now your life has had: no clear goals or purpose at all—very clear goals and purpose

1	2	3	4	5	6	7
Very clear Purpose or Goals						No clear purpose and Goals

5 Do you have the feeling that you're being treated unfairly?

1	2	3	4	5	6	7
Very seldom or never						Very often

6 Do you have the feeling that you are in an unfamiliar situation and don't know what to do?

1	2	3	4	5	6	7
Very seldom or never						Very often

7 Doing the things you do every day is: a source of deep pleasure and satisfaction—a source of pain and boredom

1	2	3	4	5	6	7
A source Of deep pleasure And satisfaction						A source of pain and boredom

8 Do you have very mixed-up feelings and ideas?

1	2	3	4	5	6	7
Very seldom or never						Very often

9 Does it happen that you have feelings inside you would rather not feel?

1	2	3	4	5	6	7
Very seldom or never						Very often

10 Many people—even those with strong character—sometimes feel like sad losers in a certain situation. How often have you felt this way in the past?

1	2	3	4	5	6	7
Never						Very often

11 When something has happened have you generally found that: you overestimated or underestimated its importance—you saw things in the right proportion

1	2	3	4	5	6	7
Right Proportions						Under/Over-est.

12 How often do you have the feeling that there’s little meaning in the things you do in your daily life?

1	2	3	4	5	6	7
Very seldom or never						Very often

13 How often do you have the feeling that you’re not sure you can keep under control?

1	2	3	4	5	6	7
Very seldom or never						Very often

Appendix I – Adaptive Skills

Waisman Activities of Daily Living Scale (W-ADL) Instructions: “We would like to know about your current level of independence in performing activities of daily living. For each activity please tell me the number which best describes your ability to do the task. For example, Independent would mean you are able to do the task without any help or assistance”

PLEASE RATE YOUR LEVEL OF INDEPENDENCE IN...
2 = Independent or without help
1 = Able to do with some help
0 = Not able to do at all

1. Making your own bed
2. Doing household tasks, including picking up around the house, putting things away, light housecleaning, etc.
3. Doing errands, including shopping in stores
4. Doing home repairs, including simple repairs around the house, non-technical in nature; for example, changing light bulbs or repairing a loose screw
5. Doing laundry, washing and drying
6. Washing/bathing
7. Grooming, brushing teeth, combing and/or brushing hair
8. Dressing and undressing
9. Toileting
10. Preparing simple foods requiring no mixing or cooking, including sandwiches, cold cereal, etc.
11. Mixing and cooking simple foods, fry eggs, make pancakes, heat food in microwave, etc.
12. Preparing complete meal
13. Setting and clearing table
14. Drinking from a cup
15. Eating from a plate
16. Washing dishes (including using a dishwasher)
17. Banking and managing daily finances, including keeping track of cash, checking account, paying bills, etc. (Note: if you can do a portion but not all circle ‘1’ with help.)

Appendix J – Perceived Informal Support

Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet & Farley, 1988)

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Circle the "1" if you **Very Strongly Disagree**
Circle the "2" if you **Strongly Disagree**
Circle the "3" if you **Mildly Disagree**
Circle the "4" if you are **Neutral**
Circle the "5" if you **Mildly Agree**
Circle the "6" if you **Strongly Agree**
Circle the "7" if you **Very Strongly Agree**

1.	There is a special person who is around when I am in need.	1 2 3 4 5 6 7
2.	There is a special person with whom I can share my joys and sorrows.	1 2 3 4 5 6 7
3.	My family really tries to help me.	1 2 3 4 5 6 7
4.	I get the emotional help and support I need from my family.	1 2 3 4 5 6 7
5.	I have a special person who is a real source of comfort to me.	1 2 3 4 5 6 7
6.	My friends really try to help me.	1 2 3 4 5 6 7
7.	I can count on my friends when things go wrong.	1 2 3 4 5 6 7
8.	I can talk about my problems with my family.	1 2 3 4 5 6 7
9.	I have friends with whom I can share my joys and sorrows.	1 2 3 4 5 6 7
10.	There is a special person in my life who cares about my feelings.	1 2 3 4 5 6 7
11.	My family is willing to help me make decisions.	1 2 3 4 5 6 7
12.	I can talk about my problems with my friends.	1 2 3 4 5 6 7

Appendix K – Leisure Needs Fulfilment

LEISURE SATISFACTION MEASURE (LSM)

Purpose: The purpose of the Leisure Satisfaction Measure is to determine the degree to which you are currently content with your leisure.

Directions: Listed below are 24 statements. For each line please indicate how true that statement is. A "1" means that the statement is almost never true, "2" means that it is seldom true, "3" means it is sometimes true, "4" means it is often true, and "5" means it is almost always true. Right down the number that best fits your situation.

Definition: "Leisure activities" are those things that you do that are not part of your work and are not part of your basic grooming needs.

1- ALMOST NEVER TRUE 2- SELDOM TRUE 3- SOMEWHAT TRUE 4- OFTEN TRUE 5- ALMOST ALWAYS TRUE

1. My leisure activities are very interesting to me.
2. My leisure activities give me self-confidence.
3. My leisure activities give me a sense of accomplishment.
4. I use many different skills and abilities in my leisure activities.
5. My leisure activities increase my knowledge about things around me.
6. My leisure activities provide opportunities to try new things.
7. My leisure activities help me to learn about myself.
8. My leisure activities help me to learn about other people.
9. I have social interaction with others through leisure activities.
10. My leisure activities have helped me to develop close relationships with others.
11. The people I meet in my leisure activities are friendly.
12. I associate with people in my free time who enjoy doing leisure activities a great deal.
13. My leisure activities help me to relax.
14. My leisure activities help relieve stress.
15. My leisure activities contribute to my emotional well-being.
16. I engage in leisure activities simply because I like doing them.
17. My leisure activities are physically challenging.
18. I do leisure activities which develop my physical fitness.
19. I do leisure activities which restore me physically.
20. My leisure activities help me to stay healthy.
21. The area or places where I engage in my leisure activities are fresh and clean.
22. The area or places where I engage in my leisure activities are interesting.
23. The area or places where I engage in my leisure activities are beautiful.
24. The area or places where I engage in my leisure activities are well designed.

Appendix L – Life Satisfaction

Satisfaction with Life Scale

Instructions: Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

• 7 - Strongly agree
• 6 - Agree
• 5 - Slightly agree
• 4 - Neither agree nor disagree
• 3 - Slightly disagree
• 2 - Disagree
• 1 - Strongly disagree

____ In most ways my life is close to my ideal.
____ The conditions of my life are excellent.
____ I am satisfied with my life.
____ So far I have gotten the important things I want in life.
____ If I could live my life over, I would change almost nothing.

Appendix M – Biological Sex

What biological sex were you assigned at birth?

Male

Female

Appendix N – Co-Occurring Mental Health

Do you have any other mental health conditions?
Specify

Appendix O - Employment Status

Are you currently employed?

- Yes
  - Full-time (30 or more hours per week)
  - Part-time (under 30 hours per week)
- No
  - Looking for employment
  - Student
  - Homemaker/Stay at home parent
  - Retired
  - Unable to work

Appendix P – Received Formal Support

Have you used any of the following services over the previous month (check all that apply)?

Employment or day programs
Social skills programs
Life skills training
Recreation programs
Post-secondary educational programs
Mental health treatment

Appendix Q – Perceived Formal Support

Do you have access to any of the following services if needed (check all that apply)?

Employment or day programs

Yes/No/Don't Know

Social skills programs

Yes/No/Don't Know

Life skills training

Yes/No/Don't Know

Recreation programs

Yes/No/Don't Know

Post-secondary educational programs

Yes/No/Don't Know

Mental health treatment

Yes/No/Don't Know

Appendix R – Received Informal Support

Over the past month, have you received help or assistance from friends, family members or a romantic partner?

1 = Not at all; 4 = Some support; 7 = Daily support

	Friends					
1	2	3	4	5	6	7
	Family					
1	2	3	4	5	6	7
	Romantic Partner					
1	2	3	4	5	6	7

Appendix S – Leisure Engagement

The following is a list of leisure categories. Please indicate how often you engage in each activity category during a typical week. If an activity falls into more than one category, check the one that fits best. Do not check more than one category for each activity. For example, if your activity is reading a book, check "solitary activities". Do not also check "In-home electronic activities", even if you read your book at home on an e-reader. On the other hand, if you read a book, and you played video games at home, you would check "solitary activities" for reading a book and "In-home electronic activities" for playing video games.

Check all that apply)

Solitary activities and hobbies (i.e., non-electronic activities performed by oneself for the purpose of leisure; e.g., reading a book)

Never Sometimes Often Everyday

Social activities (i.e., activities done for the purpose of interacting with others; e.g., hanging out with friends)

Never Sometimes Often Everyday

In-home electronic activities (i.e., activities using electronic devices for purposes of leisure and/or relaxation; e.g., playing video games)

Never Sometimes Often Everyday

Outdoor activities (i.e., activities done for the purpose of experience nature; e.g., walking in the woods)

Never Sometimes Often Everyday

Gross-motor activities (i.e., activities done for the purpose of physical exercise and/or coordination; e.g., going to the gym; playing sports)

Never Sometimes Often Everyday

Visiting clubs (i.e., activities done for the purpose of pursuing and sharing a specific interest; e.g., card game clubs; autism groups)

Never Sometimes Often Everyday

Curriculum Vitae

Sebastian Pacey-Smith

Universities Attended (with dates and degrees obtained):

2013 – Ongoing Ph.D. Clinical Psychology, University of New Brunswick

2008 – 2013 B.Sc. (Honours) Psychology, University of New Brunswick

Conference Presentations:

Weber, R., Motamed-Yeganeh, N., Wallace, A., McClure, R., Bridger, A., King, R. & **Pacey-Smith, S**. (2021, February). *Initial Outcomes of an Executive Functioning Coaching Intervention with Postsecondary Students*. Poster presentation at the International Neuropsychological Society Conference (Online).

Pacey-Smith, S. & D'Entremont, B. (2015, May). *Hobbies in Adults with ASD: A Descriptive Exploratory Analysis.* Poster presentation at the International Meeting for Autism Research (IMFAR), Salt Lake City, Utah.

Pacey-Smith, S. & D'Entremont, B. (2013, May). *Investigating the Effect of Community-Based Behavioural Intervention on Social Communication in Children with Autism.* Oral presentation at the meeting of the Science Atlantic Student Psychology Conference, Saint Mary's University.

Pacey-Smith, S. & D'Entremont, B. (2013, April). *Investigating the Effect of Community-Based Behavioural Intervention on Social Communication in Children with Autism.* Oral presentation at the undergraduate honours conference, University of New-Brunswick.

Pacey-Smith, S. & D'Entremont, B. (2012, May). *Modelling interventions for improving play skills in preschoolers with autism spectrum disorders*. Poster presentation at the meeting of Science Atlantic Student Psychology Conference, Acadia University.